American Engineer

JANUARY 1954

IN THIS ISSUE . . .

- **BUSINESS AND EDUCATION— A NECESSARY PARTNERSHIP**

  By Frank W. Abrams

  Past Chairman of the Board, Standard Oil Company of New Jersey

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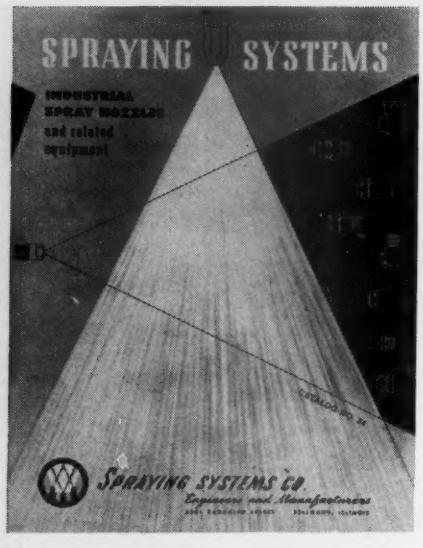

INDUSTRIAL SPRAY NOZZLE CATALOG—Spraying Systems Co. has just announced a complete 48 page reference catalog, Catalog No. 24. Thousands of standard and special industrial spray nozzles are illustrated and described. For each nozzle, complete data is listed covering capacity, spray angle and dimensional specifications. Spray nozzles are indexed in terms of "Spray Patterns." In addition to spray nozzles, information is supplied on a wide variety of related equipment such as line strainers, elbows, check valves, and adjustable joints. For handy use by the engineer, tables are included on spray coverage and pipe frictions. Write to Spraying Systems Co., 3201 Randolph Street, Bellwood, Illinois.

—AE—

NIPPLES BOOKLET—"Wrought Iron Nipples," is the title of a folder-type bulletin recently prepared by A. M. Byers Company to help technicians complete wrought iron piping specifications.

The new bulletin explains how to identify wrought iron nipples and contains a full page of size and dimentional data. Separate tables list stock sizes and lengths in inches of standard weight and extra strong nipples.

Copies of the "Wrought Iron Nipples" bulletin can be obtained by writing A. M. Byers Company, Clark Building, Pittsburgh, Pa.

—AE—

HARDFACING BULLETIN — "Selection and Evaluation of Methods of Hardfacing," a 12-page reprint of an article that appeared in The Welding Journal, is being offered by Air Reduction.

The Major methods employed in the application of hardfacing materials are discussed, with special emphasis on the inert-gas-shielded arc process. Twenty illustrations, including photographs of overlay specimens and photomicrographs of deposits, make this booklet an easy-to-read guide in the selection of a hardfacing method for any particular application.

Request your copy by writing Air Reduction Sales Company, a division of Air Reduction Co., Inc., 60 East 42nd Street, New York 17, New York.

CONTROL UNIT BULLETIN—A new catalog sheet describing the MRC-21 Strain Gage Control Unit has been announced by Hathaway Instruments Co.

This instrument, together with the strain gages and a recording oscillograph is a complete strain-measuring laboratory suitable for the determination of both static and dynamic strain in mechanical members of all kinds. An important new feature is provision for automatic calibration of the entire system any time, merely by pressing a button, and channels can be calibrated at different values of strain.

—AE—

LUBRICATING BULLETIN—Comparisons of methods for lubricating electric motors are depicted in a new bulletin just issued by U. S. Electrical Motors Inc. The bulletin illustrates the three principal types of bearings used in motors—cartridge, standard open, and Lubriflush types—with explanations of the function of each. For demonstrating the action of re-lubrication in the U. S. Lubriflush bearings, a series of natural color photos of a transparent bearing housing is reproduced. Proof that any motor bearing breathes air and therefore leads to contamination of the bearing is demonstrated photographically. Write to U. S. Electrical Motors Inc. and ask for Bulletin 1848, Box 2058, Los Angeles 54, Calif.

—AE—

CLAD METALS BOOKLET—"An Introduction to Clad Metals," has just been announced by the Superior Steel Corporation.

Written by Walter L. Keene, Superior's Director of Research and holder of many basic patents in metal cladding, it offers a comprehensive survey of the manufacture and applications of Stainless-, Copper-, Brass- and other Clad Steels.

Heading include a "General Introduction," "Definition of Clad Metals," "Principles of Bonding," "Characteristics of Clad Metals," "Methods of Cladding" and "Applications." The illustrated booklet shows the basic equipment and processes used in cladding methods attempted in the past, as well as those now in use. Address: Superior Steel Corporation, Carnegie, Pennsylvania.

MOVIE ON EXCAVATING NOW AVAILABLE

Now available for showing is a new 16mm sound color movie featuring the Hyster "Hystaway" Excavator-Crane attachment for Caterpillar-built tractors. The new movie, "Design For Excavating," graphically illustrates the Hystaway Excavator-Crane in actual operation on the D6, D7 and D8 tractors. All scenes are actual on-the-job studies.

Featured is the quick change from shovel to backhoe, clamshell, crane, pile driver and bulldozer. Many new earthmoving, construction and materials handling ideas are shown.

Arrangements to book the movie, "Design For Excavating," can be made at any Caterpillar-Hyster dealer; or information can be obtained by writing to Hyster Company, 2902 N. E. Clackmas St., Portland 8, Ore.

NEW ELECTRONIC EQUIPMENT HANDBOOK—The new 1954 edition of the Alden Handbook, "IDEAS—TECHNIQUES—DESIGNS" is packed with new standard components for unitizing electronic equipment. It provides new data and planning sheets on Plug-in Packages and Basic Chassis for unitizing equipment and giving it 30-second interchangeability. New models of connectors and interconnecting systems that allow dynamic color-coding for easy circuit tracing have been added. Available from: Department HB, Alden Products Co., 117 North Main Street, Brockton, Mass.

—AE—

CONCRETE HANDBOOK—A 56 page Manual for Handling and Placing Concrete is offered by Gar-Bro Manufacturing Company as a guide to the latest approved methods. It is a condensed handbook which covers all phases of concrete construction methods from the selection of concrete through the batching and placing procedures. The booklet provides complete check lists of job specifications, job conditions and equipment. It lists the available current technical data . . . includes many useful tables . . . illustrates correct and incorrect placing methods . . . and shows unusual jobs and how they were solved. Write: Gar-Bro Manufacturing Company, 2415 East Washington Blvd., Los Angeles 21, Calif.

—AE—

FACING TILE BULLETIN—"Uniwall" is the name of a new line of loadbearing facing tile recently developed by Natco Corporation and now in production.

It makes possible single-unit wall construction with finished facing inside and out. Interior surface is ceramic glazed. The exterior finish is natural Buff Range Unglazed Rug-Tex. The Uniwall units are made with a jamb slot to receive the "fin" of a metal window or the blind stop extension of a wooden window. A complete line of interior ceramic glazed shapes are available to supplement the standard Uniwall units.

Specifications are provided in the new Technical Bulletin UW 100 by Natco Corporation, 327-29 Fifth Avenue, Pittsburgh 22, Pa.

Letters

May We Take A Bow? . . .

Dear Editor:

We, the members or the East Bay Chapter of the California Society of Professional Engineers, wish to compliment you and your staff for the excellent job you have done on the November issue of the AMERICAN ENGINEER.

Our members were interested in Mr. Tucker's article on, "The Engineer in Public Life," the author being an acquaintance of one of our members. We also enjoyed reading and found the following articles helpful professionally: "Safety Is Our Business," "The Engineer as an Expert Witness," and "Patent Fundamentals for Engineers."

May we again express our appreciation for a job well done.

JAMES T. MOYNIHAN, JR., P.E.,
Secretary
Berkeley, Calif.

More Kind Words . . .

Gentlemen:

After receiving four of the current issues of the AMERICAN ENGINEER, I am impressed with both the magazine and the job it is doing for the members of the National organization. The articles that have appeared thus far have been interesting and informative; and I always look forward to the next issue and the fine articles, legislative analyses, and other features that appear in your fine magazine.

At the time that I received my first copy of the magazine, a sample copy of the Legislative Bulletin was enclosed. I would like to be on the regular mailing list for the Bulletin as I find it to be the fastest way to keep apace of legal professional developments. . . .

Thank you and keep up the good work with the magazine, the Bulletin and any other ways possible to better inform the engineers of America of the work being done to secure professional status.

RALPH G. RUTH, P.E.,
Tulsa, Okla.

Puerto Rican Bridge . . .

Dear Editor:

. . . I am also pleased to see on page 15 of your December issue a construction photograph of the $2,300,000 Constitution Bridge at San Juan, P. R. It would be of interest to your readers to know that this bridge is the job of D. B. Steinman, first President of NSPE. My engagement on this job covers complete engineering services, including design and supervision of construction. . . . Since it is one of the objectives of NSPE to see that engineers are given credit for their work, it would be appropriate for you to print a suitable credit note in the next issue of the AMERICAN ENGINEER. Your courtesy will be appreciated.

D. B. STEINMAN, P.E.,
New York, N. Y.

Ohio Court Case . . .

Dear Editor:

Relative to the article entitled "Professional Status of Surveyors at Stake in Ohio Court Case" in the November issue of AMERICAN ENGINEER, may I comment that in general the article is quite accurate. It is, however, grossly inaccurate insofar as it assumes that the question of professional status is limited to surveyors.

As I indicated in a letter to Executive Director Paul Robbins, dated October 19, 1953, there is some tendency on the part of our members towards an ostrich complex in preferring to assume that the matter is not too important, since it involves (they assume) only surveyors.

Permit me to quote from the opinion of the judge in this case:

"The word malpractice as contained in statutes of limitation has been given a restricted meaning to confine it to indicating a corrupt or culpably incompetent practitioner of either law or medicine. . . . There is no listing of the profession of *architecture, surveying,* or *engineering* in any of their branches."

Again I quote: (from the judge's opinion)

"I fail to find a single reported case in which the tort or contract breach of an *architect, surveyor,* or *engineer* came within the purvue of the term malpractice as used in any code of civil procedure."

Whatever the effect of this case, it is clearly not limited to surveyors.

S. A. BAUER, P.E.,
Cleveland, O.

Bausch & Lomb Story . . .

Dear Editor:

I received the November, 1953, issue of the AMERICAN ENGINEER today, and the article on "Bausch & Lomb's 100 Years" caught my eye at once. My wife, Martha Tarplee was employed for 10 years by Bausch & Lomb, most of that time in the Scientific Bureau. She worked under Dr. Coleman, and in association with Arthur E. Neumer, and others of the Bureau. She is well acquainted in the Rochester plant, and has the highest regard for the work of the Scientific Bureau.

I am personally acquainted with many of her associates, and regard highly their work in the field of engineering optics. *However, none of the names mentioned in this article appear in the Bulletin of Registered Professional Engineers and Land Surveyors,* University of the State of New York, No. 1409, July 1952. (Latest published Bulletin.)

So far as I have been able to determine, only two *registered professional engineers* have been employed by Bausch & Lomb, and both of these men have now left the company.

This article is replete with references to "engineers" and "engineering." Is this usage in accord with the aims and objectives of the NSPE? Or is this, perhaps, an article which was cheaply and readily available?

May I stress that this is not a personal attack on any individual at Bausch & Lomb. However, if Bausch & Lomb employees with engineering training desire to be referred to as "engineers," I do heartily believe that they should qualify for registration as *professional engineers.*

GEO. B. TARPLEE, P.E.,
Rochester, N. Y.

Special February Issue!

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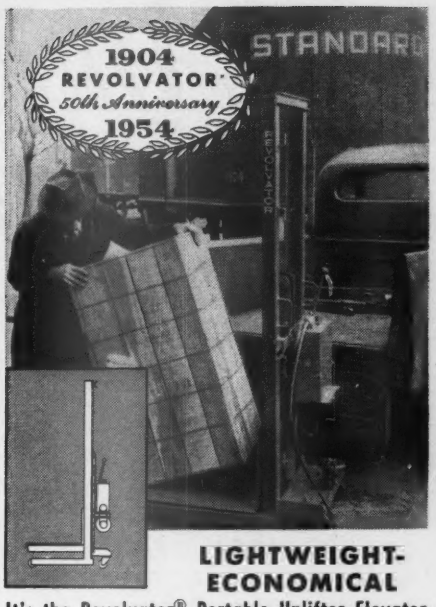

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Of all the qualities which go into leadership, probably the most important is the capacity to command instinctive respect. But in order to command instinctive respect, one must have qualities of integrity, self-confidence, and acumen.

—Frank Pace, Jr., Executive Vice President, General Dynamics Corporation, and former Secretary of the Army

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• SPECIAL ARTICLES

Business and Education—A Necessary Partnership 9
By Frank W. Abrams, Past Chairman of the Board, Standard Oil Company of New Jersey. A discussion of the need for closer cooperation between industry and institutions of higher learning.

Assignment and Promotion 15
By Clarence B. Randall, Chairman of the Board, Inland Steel Company. A thought-provoking chapter from Mr. Randall's new book, **Freedom's Faith.**

Conference Board's Third Report Is Ready 13
Eisenhower Sends Engineers' Week Message 22
An Engineering Solution to the Strike Problem 25
By Pilson W. Kelly, P.E.

American Engineer Index for 1953 36

• REGULAR FEATURES

Letters 3
Professional News Briefs 6
From Washington 19
Professional Postscripts 20
American Engineer Special Report 24
NSPE Believes—The Conference Board 28
With Our Members 30
Strictly Business 41

New Literature .... Inside Front Cover
Contractors Directory 8
Advertisers Index 27
Classified Ads .. 14 Professional Directory .. 32, 33, 34, 35
What's New—New Products of Interest 42

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NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS FOUNDED 1934

Resources Conference Draws Many Engineers

The Mid-Century Conference on Resources for the Future, held in Washington, December 2-4, drew close to 1500 delegates including many engineers to whom the meeting was of great interest.

Initiated by Resources for the Future, Inc., a private nonprofit corporation, and financed by a grant from The Ford Foundation, the meeting was called for the purpose of surveying the nation's natural resources situation with a view toward determining the needs for the future.

The Conference was organized in eight sections meeting concurrently. The discussions of particular interest to engineers were those concerned with Domestic Problems of Nonfuel Minerals, Energy Resource Problems, and Water Resource Problems. The other main topics considered were: Competing Demands for Use of Land, Utilization and Development of Land Resources, U. S. Concern with World Resources, Problems in Resources Research, and Patterns of Cooperation.

Three questions were considered basic to all discussions: (1) Will the nation's resource base be so diminished during the next 25 years as to precipitate a series of critical situations? (2) Can such situations satisfactorily be left to extemporaneous solution, or have we reached a point in our economic development when it is desirable for industry, government, and citizens to work toward coordinated resource study and action? (3) Do we know enough about our resources, their interrelationships, the possibilities for substitution and technological advances, and the needs and resources of other nations, to make it possible to foresee and mitigate critical situations?

Lewis W. Douglas, chairman of the board, Mutual Life Insurance Company of New York, and former ambassador to Great Britain, served as chairman of the Conference. Vice chairmen were: Herman W. Steinkraus, president, Bridgeport Brass Co.; Karl T. Compton, chairman of the corporation, Massachusetts Institute of Technology; and Lewis Webster Jones, president, Rutgers University. Norvell W. Page was director.

NSPE was represented among the delegates by Vice President Clarence T. Shoch, chairman of the Society's National Affairs Committee, and Executive Director Paul H. Robbins.

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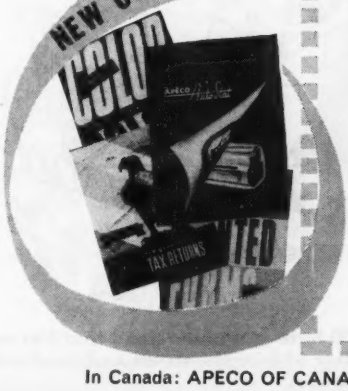

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Professional News in Capsule Form

Lewis K. Sillcox to Head Mechanical Engineers • NSF Committee to Study Effect of Government Financial Support on Research in Colleges • H. A. Winne Receives James H. McGraw Medal • F. J. Magnuson Honored by Public Works Group • Other Items of Interest

Lewis K. Sillcox of Watertown, N. Y., a member of the New York State SPE, has been elected president of The American Society of Mechanical Engineers for 1954. Mr. Sillcox, who is honorary vice chairman of the board of The New York Air Brake Company, has been identified with the transportation industry since 1903. For many years he has also been a lecturer on transportation and economics at the Harvard Graduate School of Business Administration, Yale, and M.I.T. At Princeton, he has lectured on subjects relating to railway practice and applied mechanics; and, in addition, he is a lecturer in engineering at Purdue.

The new president succeeds Frederick S. Blackall, Jr., of Woonsocket, R. I.

* * *

The establishment of a National Science Foundation Advisory Committee to consider the effects of government support to colleges and universities on their research and teaching functions has been announced by NSF Director Alan T. Waterman.

Chester I. Barnard, chairman of the National Science Board, will head the new committee. Other members are: Arthur S. Adams, president, American Council on Education; Vannevar Bush, president, Carnegie Institution of Washington; James S. Coles, president, Bowdoin College; Harold W. Dodds, president, Princeton University; Conrad A. Elvehjem, dean of the Graduate School, University of Wisconsin; T. Keith Glennan, president, Case Institute of Technology; Virgil M. Hancher, president, State University of Iowa; William V. Houston, president, Rice Institute; Clark Kerr, chancellor, University of California, Berkeley; C. N. H. Long, professor of physiology, Yale University; Don Price, associate director, The Ford Foundation; and Julius A. Stratton, provost, Massachusetts Institute of Technology.

* * *

Harry A. Winne, vice president of the General Electric Company, Schenectady, N. Y., and a prominent member of the New York State Society of Professional Engineers, has received the James H. McGraw "Manufacturers' Medal" in recognition of "his outstanding industrial statesmanship contributing to the advancement of the electrical manufacturing industry in the fields of engineering and nuclear research." The award was presented to Mr. Winne at the annual convention of the National Electrical Manufacturers Association, held at the Haddon Hall Hotel in Atlantic City.

At the same time, the James H. McGraw "Medal for Cooperation" was awarded to Bonnell W. Clark of Darien, Conn., former Westinghouse Electric Corporation vice president, now retired.

During the meeting J. H. Jewell of Pittsburgh, Westinghouse vice president, was elected to the presidency of the Association, succeeding L. G. Hall of St. Marys, Pa., president of the Stackpole Carbon Company.

* * *

Francis J. Magnuson, city engineer of North Mankato, Minn., and a member of the Minnesota Society of Professional Engineers, was named recently as the 1953 recipient of the Charles Walter Nichols Award, which is given in recognition of outstanding and meritorious achievement in the public works field.

The award, consisting of $500 and a scroll of recognition, was presented to Mr. Magnuson during the annual convention of the American Public Works Association held in New Orleans, La. He was cited for his engineering ability and, in particular, for the responsibility and ingenuity he showed in restoring and improving the ways and means of restoring street sanitation, the water supply, and sanitary facilities under extremely difficult conditions during the North Mankato flood in the spring of 1951, as well as for his work in preventing a similar disaster in the spring of 1952.

* * *

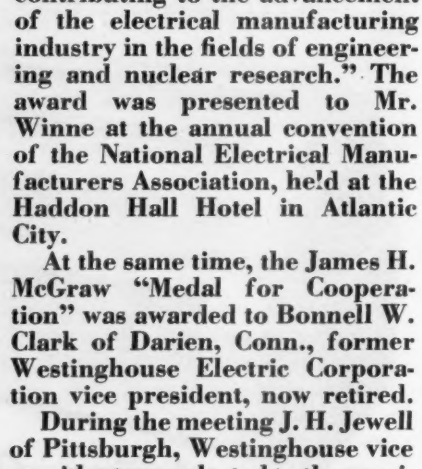
Arthur S. Flemming, director of the Office of Defense Mobilization, has urged that more women be encouraged to study engineering. While conceding that many women graduates of engineering schools would work for only a short time before marrying and turning their attention to raising families, he asserted that: "In the event of an emergency, a large number of them would be willing to return to work even though it called for real sacrifice on their part in order to do so.

"Today, however, we are not calling these opportunities to the attention of women in a forcible way. Furthermore, there are some engineering schools that have failed to put out a welcome mat to women students."

Mr. Flemming spoke before the convention of the Association of Land-Grant Colleges and Universities in Columbus, Ohio. He also stated that improved counseling and guidance on the part of the colleges would bring more competent persons into the technical and scientific professions.

* * *

A prominent member of the Missouri Society of Professional Engineers—Dr. Curtis L. Wilson of the



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Missouri School of Mines and chairman, Inter-Society Relations Committee of the NSPE—is heading a seven-man team now studying the organization and operating procedures of the Bureau of Mines. The investigative group was appointed by Secretary of the Interior Douglas McKay.

* * *

Ancher Nelsen, administrator of the Rural Electrification Administration, has recently made the following comment: "It will be noted that a number of engineers have key positions in the reorganized electric staff. One of the reasons for this is that the high cost of materials and construction presents one of the major problems of rural electric systems. It will be recalled that in the early days of REA, the engineers did the impossible. They were able to find ways to reduce costs to a point where electric service was within the means of the farmers of this country. There are still many, many major engineering problems in the electric program, and the success of the rural telephone program may hinge on how well our engineering people are able to meet the problem of telephone construction."

* * *

Phillip B. Hall, assistant director of public works for Alexandria, Va., and a past president of the Northern Virginia Chapter, Virginia SPE, has been elected chairman of the Northern Virginia Regional Planning Commission for a two-year term.

* * *

The Society of Women Engineers has announced that its national convention will be held in Washington, D. C., March 5-7, 1954. The meeting will open officially at the Mayflower Hotel on Saturday, March 6; but arrangements have been made for trips on the 5th to the National Bureau of Standards, the David M. Taylor Model Basin, and the U. S. Navy Engineering Experiment Station, and for luncheon at the Naval Academy in Annapolis, Md., where the Station is located. The theme selected for the meeting is "The Woman Engineer's Contribution in a Peacetime Economy."

* * *

Two NSPE men—Frank H. Newnam, Jr., of Houston, Tex., and Wesley W. Horner of St. Louis, Mo.—have been named to the "task force" studying the activity of the Federal Government in the field of water resources and power generation and distribution. The group is a division of the Commission on Organization of the Executive Branch of the Government, which is headed by Former President Herbert Hoover.

Mr. Horner is a member of the Missouri SPE. Mr. Newnam, a member of the Texas SPE, is a past president of the San Jacinto Chapter.

* * *

The National Research Council of the National Academy of Sciences has set up a Committee on Disaster Studies under the Council's Division of Anthropology and Psychology. The Committee, in turn, has established a Clearinghouse for Disaster Studies in order to effect exchange of information on disaster studies or related research. The Clearinghouse, it has been announced, is anxious to receive any reports on such research in order to further its efforts. Such information may be sent to the Clearinghouse at 2101 Constitution Ave., Washington 25, D. C.

* * *

The sixtieth annual meeting of The American Society of Heating and Ventilating Engineers is scheduled for the Rice Hotel, Houston, Texas, January 25-27, according to D. M. Mills, general chairman of the Committee on Arrangements.

During the meeting, Walter L. Fleisher of New York will receive the F. Paul Anderson Medal in recognition of his outstanding contributions to the advancement of heating, ventilating, and air conditioning.

* * *

George Edward Holbrook, assistant director of the development department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has received the 1953 Professional Progress Award in chemical engineering from the American Institute of Chemical Engineers. The award, which is sponsored by the Celanese Corporation of America, was presented to Mr. Holbrook during the Institute's annual meeting, December 13-16, in St. Louis.

* * *

Tomorrow will be the age of the engineer, Norman C. Owen, vice president and director of the Webster-Chicago Corporation, has declared, "provided that his own technical thoughts and terminologies are translated into a form of communications not only understood but accepted and promptly adopted."

Speaking before a meeting of the Chicago Engineers Club, Mr. Owen told his listeners that the trend toward automatic manufacturing operations and more automatic consumer products will make the engineer the key man in many manufacturing companies—if he can also gain the understanding and following of the sales force, the financial men, and others by putting his ideas across to them in clear, unmistakable terms.

* * *

Technological progress has been a primary factor contributing to the expansion of equipment purchases by private business in recent years, according to the Office of Business Economics of the Department of Commerce. The agency, which has just completed a survey of equipment purchases by private industry from 1929 to 1952, states that: "Investment in equipment in recent years has been stimulated not only by the high volume of output and by postwar defense needs but also by technological progress." Such progress, the agency's report continues, "has made it possible to lower operating costs by using new instead of prewar equipment. It has also led to the development and introduction of equipment designed to provide new types of products."

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Georgia Engineers Win Right to Vote on Union Question

Engineering employees of Lockheed Aircraft Corporation, Georgia Division, have won the right to an election to determine employment representation desires over the determined opposition of the union now representing the group of more than 640 employees.

The petition for a decertification election, as authorized by the Taft-Hartley Act, was filed by two individual engineer employees of the company, contending that the Engineers and Architects Association, Aircraft Chapter, Marietta Section, did not represent the desires of the affected engineering employees. The union, which is affiliated with ESA, the national collective bargaining federation of engineering unions, refused a consent election and a hearing was held before a regional NLRB officer.

The union unsuccessfully attacked the validity of the decertification petition on the ground that one of the petitioners (J. T. French, a member of the Georgia SPE) was a supervisor and therefore a representative of management. French replied that he had acted as a supervisor in the temporary absence of his Group Supervisor and only for a total period of 18 days in two and one-half years. The NLRB, in upholding French's position, found that he did not possess the authority of a supervisor or assume the full duties and responsibilities of the post. The NLRB found that he had no authority to hire, discharge, reprimand, discipline or take any other personnel action with respect to employees indicated in the Taft-Hartley Act definition of "supervisor."

As a result of the NLRB decision, a decertification election will be held among the affected engineering employees probably in January. If a majority vote against continued representation by the ESA-affiliated union the entire group will be decertified and will have the choice of forming a new bargaining unit or refraining from any collective bargaining representation. The Decertification Committee has stated in a communication to the affected engineering personnel that representation by the union has resulted in income losses, in addition to union dues. "The E.A.A. has had two years to try to be of value to you and they have failed miserably," the Committee told the employees. "It is a well known fact that management of companies, and all technical societies, indicate to technical employees that being represented by a union is a disadvantage to the employees and greatly lowers his professional status. Why not give Lockheed a chance to prove this! If you are not satisfied with the treatment you receive by the company, you can always petition the NLRB for union representation at any time. Any company would be foolish to conduct themselves in such a way to make this necessary, however."

An interesting fact surrounding the case is that the decertification election will be the first opportunity the engineering employees will have had to vote on the union representation question since the company located its Georgia plant in January, 1951. The union had been certified as the bargaining representative for the company's plants in California and had "carried over" to the Georgia plant on the basis of the California representation.

After first taking the position that a separate election should not be held at the Georgia plant because the union was certified on a company-wide basis (in California), the E.A.A. changed its position and admitted that the Georgia plant was an appropriate grouping of affected employees.

Of national interest, and particularly in connection with the pending Freedom of Association amendment to the Taft-Hartley Act, being sponsored by NSPE, was the continued reference by the union during the hearing of the necessity of separating "employee" engineers and "supervisory" engineers. The purpose of the Freedom of Association bill is to make it possible for engineers in both categories to participate in the same non-bargaining professional organization.

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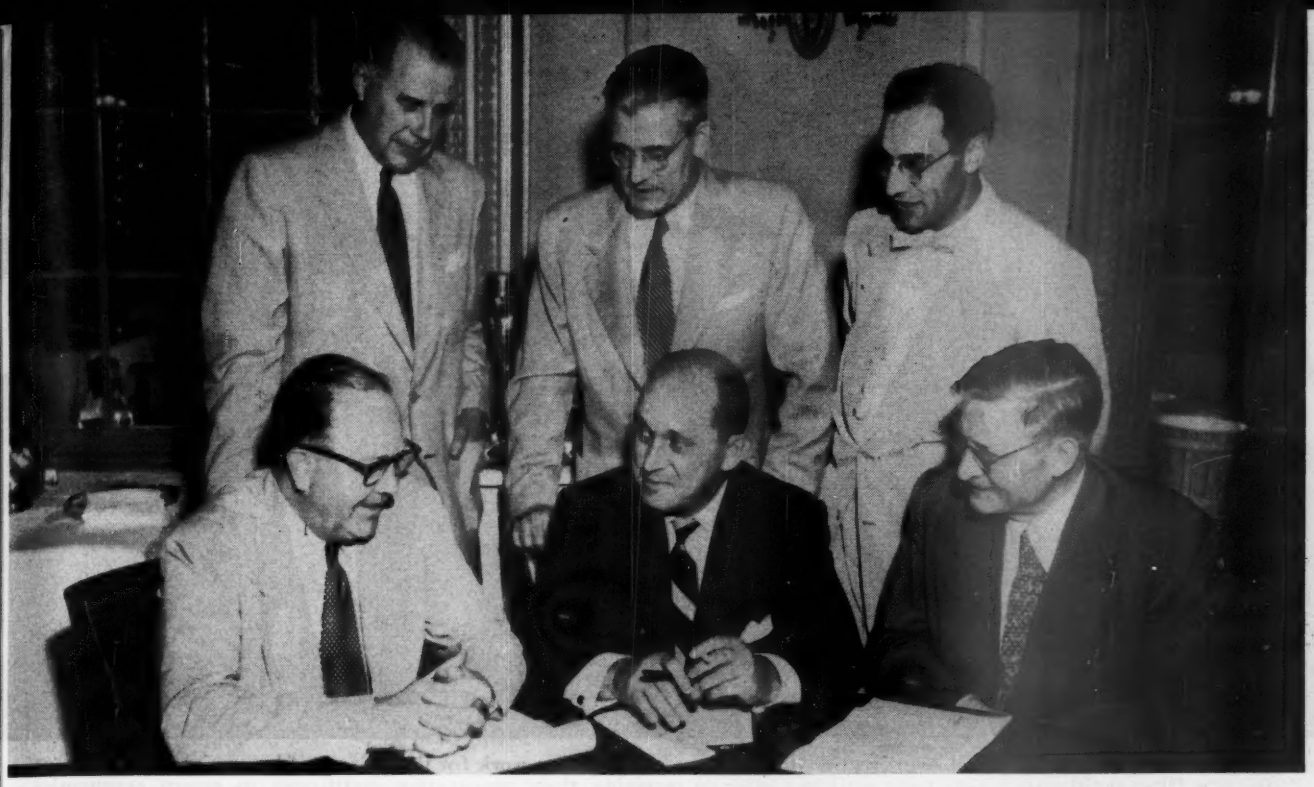

The Southern Lightweight Aggregate Corporation of Richmond, Va., has inaugurated a series of cash awards for students at the University of Virginia and Virginia Polytechnic Institute. Discussing the program, seated l. to r., are: T. Fitz Patrick, head of the U. of Va.'s School of Architecture; A. C. Ford, Solite Corp.; and C. H. Cowgill, head of V.P.I.'s School of Architecture. Standing are: H. B. Boynton; C. C. Justice, president of the Va. Chapter, American Institute of Architects, which will administer the award program; and C. A. Pearson. Messrs. Boynton and Pearson head the A.I.A. committees on competitions and education.

Business and Education—A Necessary Partnership

BY FRANK W. ABRAMS

Past Chairman of the Board
Standard Oil Company of New Jersey

THE essence of the American tradition, as I see it, is a belief in the individual, in the capacity of the free man to shape his destiny by his own efforts. Ultimately predicated upon our belief in God, this confidence of ours in the individual's ability to make the most of his opportunities and talents is basic to our political democracy. It is also basic to the intellectual atmosphere in which our scientific, cultural, and business life has flourished.

The United States has come of age as a world leader in a strange and troubled era. The forces of our times draw us in many and sometimes conflicting directions—toward technological and vocational training, for example—toward the cultivation of free and enquiring minds—toward restrictions for the sake of national security—away from restrictions for the sake of guarding the priceless right of minorities to believe what their reason and their consciences tell them to believe. Different voices are raised in favor of different subjects—and different objectives. The circle of problems that besets the American people is ever widening, calling in ever-sterner tones for maturity and good judgment.

More than ever before, men today need to know how to think; to weigh and appraise; to achieve the steadiness of vision and purpose that wisdom brings. Unless we have prudent and mature people on whom we can rely, great dangers are ahead for the well-being of the country.

Since it is largely through education and religious philosophy that man achieves maturity of judgment and

Tomorrow's leaders, such as G. C. Souders, president of the Ohio University Student Chapter, OSPE, are getting their "basic training" today in our educational institutions, says Mr. Abrams.

Engineers, as professional men, realize their serious obligation to work for the welfare of humanity. Shown above are new Ohio registrants taking their oath just prior to receiving their registration certificates in recent ceremonies sponsored by the Cleveland SPE.

arrives at a civilized state, more and more people are beginning to see that an interest in education is one of the chief responsibilities of citizenship. Among them, of course, are many engineers who, as professional men, realize that they have an obligation to work not only for themselves but also for the good of mankind.

It is obvious that if we let our educational system decay, we will gravely injure the foundation of our greatness as a nation. By the same token, if we develop our educational system, expanding it and making it stronger, we will be cultivating the greatest of our natural resources, the people—and in particular, the youth—of America. And certainly no one has a greater stake in the future of America than the American businesman, whether his main interest is in engineering, contracting, manufacturing, natural resources development or one of the thousands of other phases of the American business economy.

There are more than 3,900,000 private enterprises in this country today, not including farms, which means that there is a separate and independent business for every forty people. Thus, the business and industrial segment is indeed an integral element of our society, not a separate community with interests and needs quite different from the rest of the nation; and it is this very unity that makes its concern with education such a great one.

In general, this concern arises because the future leaders of all phases of American life are today getting their "basic training" in our educational institutions. In times like these when the relationship between freedom and a literate and educated population is thrown into clear focus, our intellectual resources as a nation, our spiritual and material well-being, and our basic freedoms depend in considerable measure upon how well higher education performs its essential tasks.

In particular, the stake of business and industry in education is important because if we could not draw upon a large reservoir of educated manpower, we would be handicapped in every phase of our operations. Obviously, of course, this handicap would be apparent first of all in the technological field where there is a constant demand for engineers and scientists of all classifications. If our hope of an advancing American economy involves reducing costs, increasing individual productivity, and devising better ways of doing things, we must look to the training grounds of American education for a steady flow of specialized talent.

But above and beyond the realm of technology, without our educational reservoir the limitation would be most keenly felt in the broader field of business leadership. The task of management is becoming increasingly complicated, requiring a wide diversity of talents and training. And while men without formal education have made spectacular records in the United States—something that is always possible in a democracy—we cannot always expect to get along on the exceptional situation. We must look more and more to institutions of higher learning for the men and women we need.

From these colleges and universities management wants young people who can see and understand business as an integrated and essential part of the complete social structure—men and women with all the good qualities of character and intelligence that the nation as a whole requires. We want them to be independent in their thinking; able to see things in their full dimensions; interested in the

Milton Eisenhower Quoted

Dr. Milton S. Eisenhower, president of Pennsylvania State College and a brother of President Eisenhower, said recently at the Industry-College Conference that "in my judgment it would pay business great dividends to finance both general and project research in economics, statistics, psychology, anthropology, sociology, commerce, finance, labor-management relations, marketing and a host of other fields. Such research would vastly improve education in these areas, and would put institutions of higher learning in a position to provide direct services to business based upon the findings of expanded research."

welfare of their fellow men and confident that the world can be improved, but aware that it is a tough job worthy of the best that is in them; and ready to work for the things in which they believe.

We are continually making progress through engineering, physics, chemistry, and all the related natural sciences. But it was never more clear than it is today that "the proper study of mankind is man," and that the most difficult issues we have to face are in the field of human relations. The vital problems of the day are in the reconciliation of conflicting viewpoints. The difficulty lies less and less in overcoming physical limitations that were evident in the past.

Of course, as I have already noted, business requires technically-trained individuals. But, above all else, it needs individuals with a capacity for fair dealing—with mental honesty and a willingness to consider the viewpoints of others. A technically-trained mind which cannot understand people, which has no faith in the fundamental integrity of others, which lacks patience and willingness to work with others in a mutual cause, is of limited value. We need in our business leadership, above everything else, the vital factors of character and human understanding which are and should be fostered in our colleges.

CONVERSELY, education cannot isolate itself from business since it has the responsibility to study and present the story of America; and the continuing growth of business and industry is a large and fundamental part of that story. Furthermore, our educational institutions must prepare their students to take their places in that economic world that business and industry have created. They certainly cannot send them out as strangers to it.

It is not, of course, the place of business to influence teachers in what they teach. I agree heartily with the many statements I have seen that it is particularly important to retain a strong, vigorous, and independent group of institutions of higher learning. I believe this is indispensable to our way of life for freedom rests on the competition of free choice, both in the business world and in the world of ideas.

Nevertheless, teachers cannot discharge their responsibilities to the community, either on the local or the national level, by retiring to ivory towers and barricading the doors. They do need an adequate body of facts about business upon which to draw in their interpretations. And our schools should, therefore, keep their doors open to free traffic with the outside world, while still maintaining their individualism and independence.

One of the biggest problems for education today is, of course, the adequate financing of its efforts. And here I am writing with particular reference to the private colleges and universities of the nation which are supported by endowments, gifts from alumni, tuitions, and other miscellaneous sources of income.

Unfortunately, all of these income sources today are becoming less and less adequate to cover the expanding needs of the private institutions. Because of falling interest rates and rising prices, each dollar of endowment now generates only about one-half the purchasing power it did two decades ago. Costs of operating the college-level institution have increased tremendously despite the fact that the typical member of the faculty has a smaller real income than he enjoyed twenty years ago. New grants to higher education from individuals are few and far between today because high income and estate taxation have prevented the accumulation of large personal fortunes. An attempt to increase revenues by raising tuitions much higher than has been done would deprive many students of deserved opportunities, or force them into the already over-crowded State universities.

Education, according to Mr. Abrams, is an important factor in creating markets for such items as automobiles and all the other "better living" products of modern industry.

Certainly this is not a healthy situation. New sources of funds must be found for private colleges if we are to preserve what President Harold W. Dodds of Princeton has called "these islands of independence in education."

LOOKING over the possible sources of additional income, therefore, we must conclude that one of the few remaining reservoirs is to be found in expanded corporation grants. The public today expects corporations to be good and constructive citizens. The people who own and manage corporations in turn wish to meet and fulfill this public expectation. In fact, one of the most important phases of the constant adaptation of the United States economy to each new challenge has been the emergence of the corporation as an instrument of society which is ready to accept voluntarily responsibilities that extend far beyond the producing, processing, and marketing of goods and services. It is one of the great developments of our time, a product both of technological advance and the processes of American democracy.

Moreover, aside from owing the colleges and universities a debt of gratitude for the quality of personnel that it unceasingly recruits and expects to recruit from among their graduates, business is dependent on education to a great extent for the quantity and quality of the markets of today and tomorrow. There is a definite correlation between education and the consumption of commodities. Statistics show that the more education our young people get, the greater will be their earning power. Education sharpens the desire of the individual for commodities such

About the Author . . .

Frank W. Abrams, whose retirement as chairman of the board of directors of Standard Oil Company (New Jersey) became effective Jan. 1, spent forty-one years with that organization, holding successive positions in petroleum refining and policy administraiton.

Mr. Abrams has long been interested in the strengthening of the American educational system and now plans to direct his major efforts toward that objective and to the field of politics as well. In the latter regard he has been asked to join the Hoover Commission on Reorganization of the Federal Government.

He has served as director and chairman of the board of The Ford Foundation's Fund for the Advancement of Education and was elected to the Foundation's board of Trustees in 1952. He is also a trustee of the Sloan Foundation and a director of the Council for Financial Aid to Education, which he describes in his article.

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as books, newspapers, automobiles, radios, television sets, home freezers, better houses, a wider variety of processed foods, and countless other items; and thus it has done more to create markets than any other force in America.

I am thoroughly convinced that American business neither needs nor wants a free ride, least of all from our private educational institutions, which we know to be hard pressed financially. In my opinion, therefore, it is not good business to withhold from these institutions needed support which it is within the power of the corporation to give.

Happily, there is a large and growing school of thought in this country which is accepting this theory that reasonable aid to worthy activities, including education, is a justified use of corporate funds. It also appears that many of the legal questions which have blocked corporate giving in the past are melting away. Many states have passed legislation conferring on corporations power to make reasonable contributions, and the decision in the recent New Jersey case of *A. P. Smith Manufacturing Company vs. Barlow et al* held that a contribution to Princeton for general education purposes was within the incidental powers of the company as well as within the express powers of the New Jersey statutes. Moreover, today's tax structure, of course, gives fairly strong encouragement to the new pattern of giving by corporations.

Perhaps the biggest remaining roadblock to corporate giving to private educational institutions is the problem of just *how* to give most effectively. The solution to this problem is no easy thing to decide.

The most popular forms of gifts to schools of higher learning usually fall into one of four categories: (1) Scholarships and fellowships; (2) Gifts for research, generally up to this time in the natural sciences; (3) Special purpose gifts to colleges or universities in the local community; and (4) Gifts for general educational purposes to individual colleges, or to groups of colleges.

THERE is much merit in each of these methods, but each also has its limitations or presents certain problems to the donor of the funds. Giving or the will to give alone is not enough. And the corporation executives who make the decision to channel corporate funds into the field of educational development also have a responsibility to the owners of the business who must be satisfied that the money is well spent and that the returns—even though in the realm of the intangible—will justify the investment. Some careful attention must, therefore, be given to developing adequate standards to guide business policies on financial aid to higher education.

First of all, it is not evident what should be used as the measure of merit. Is there an adequate way to weigh academic merit and performance so that giving may produce the most satisfactory results for all concerned? Or should academic merit necessarily govern? Should the aim of corporate giving perhaps be to bring up the quality of the less favored school? Or should it be to increase the capacity of the more adequate college?

Then there is the problem of preserving the independence of the recipient college. What measures should be taken to insure this?

To try to find the answers to these and many other perplexing questions, a group of businessmen, of which I am one, has recently organized a membership corporation under the laws of the State of New York. The new corporation is called the Council for Financial Aid to Education, Inc., and the other founders are Irving Olds, until recently, chairman of the board of the United States Steel Corporation; Alfred P. Sloan, Jr., chairman of General Motors Corporation; Walter Paepcke, chairman of the Container Corporation of America; and Henning W. Prentis, Jr., chairman of the Armstrong Cork Company.

In our certificate of incorporation we state the purposes and objectives of the new organization, as follows:

> "The purposes for which the corporation is to be formed are: To promote a better understanding by the managers and owners of American business . . . and by the members of the public, of the substantial contribution which higher education has made and is making to the effectiveness, the skill, the growth and the success of American business and to the development of this country, and to aid in bringing about a recognition by the managers and owners of American business . . . and by the members of the public, of the importance to American business and to the nation as a whole of securing adequate financial support of higher education in this country. . . .
>
> "To serve in an advisory and cooperative capacity, both to prospective contributors and to educational institutions in connection with the formulation, adoption and carrying out of the programs of various kinds having for their general purpose the obtaining of financial support. . . ."

The corporation itself is not going to distribute funds to educational institutions; nor will it solicit contributions for such a purpose. What we want to do is to help iron out the knots in the problem of corporate giving to the colleges so that good, solid standards can be determined and well thought out programs can be established.

THERE are several indispensable requirements if we are to have a social climate in which we can all work together under the most favorable conditions of understanding and cooperation for the common good. In both business and education, we must encourage the development of independent, inquiring minds. We must get from our educational system tolerant, thoughtful people who recognize democracy as one of the great living, working theories of human organization. All of us, in turn, must recognize that we must give to our educational system the attention and support that it so urgently needs.

The important thing is to tackle the problem now. Business and education must necessarily be partners in the preservation of the American tradition. Through such cooperation with, and support of, education, business and industry can help to provide for their own future.

Through the partnership of industry and education, a refreshment of ideas on both sides will occur. Education will be invigorated by its close touch with the changing life of industry. Business leadership will be helped to relate its own philosophy and policies to the great thought streams of all that is best in our culture.—**End.**

Conference Board Report "How to Attract and Hold Engineering Talent" Ready; Special February Issue of AE to Include Digest

NEXT Month the AMERICAN ENGINEER will publish its Annual National Engineers' Week issue and the leading feature will be a digest of the just released Executive Research Survey, "How to Attract and Hold Engineering Talent."

Other special features which will make the February publication one all professional engineers will want to read and file for future reference, are:

- **Engineering Salaries — An Interpretive Report**—An interpretation of a survey made of over 13,000 registered professional engineers. Contains such information as earnings by branch of profession and field of employment; years at work; regional variations; employers; geographic distribution; and the like.
- **What Industry Now Offers Engineers**—A comprehensive article, built around information gathered from many leading firms, on the incentives offered engineers in industry.
- **Professional Engineers' Buyers Guide**—An alphabetized listing by subject categories containing products and firms of interest to the registered professional engineer when he is buying or specifying. (See page 29)
- **Members and Addresses of State Registration Boards**—This is an important reference list for all engineers.

The report on "How to Attract and Hold Engineering Talent," to be briefed in the February issue, is the third of a series of studies conducted by the Professional Engineers Conference Board for Industry, in cooperation with the NSPE. It is designed to show industry how to create a climate in which a professional man can work happily and effectively in a professional capacity.

It is the end product of a survey participated in by more than 200 employers of engineers, and by 1,400 engineers employed in industry throughout the United States—engineers, who, because their identities were cloaked in anonymity, told exactly what they thought.

It shows too that the engineer of today is much more interested in personal economics than was his brother of a few years ago; that while he is still sparked by the same professional drives which motivated the Goethals and Steinmetzes and Hoovers of another era, he is interested, too, in an adequate pay check and a reasonable expectation that the figures on that check will be revised upward at pleasantly frequent intervals throughout his working life.

Because the engineers were permitted to answer the questionnaires anonymously, the survey, the third of a series intended to aid industry to better utilize its engineering manpower, brought to light many prevalent and basic faults in engineer-management relationships. But by bringing them to light, it pointed the way toward eventual lubrication of the friction points which have been holding the engineer back from the achievement of his full effectiveness in industry.

Although the report shows that the labor turnover among engineers in most industrial concerns is lower than the average for all employees, and although a majority of the engineers themselves indicated a typical reluctance to change jobs except under what they considered extreme provocation, the widespread discontent among so large a group of professional employees, coupled with a strong indication of a growing trend toward unionization, pointed to a danger which the professional cannot well ignore.

Of the 1,400 engineers who responded to the questionnaire, thirty-four per cent said they felt that they would benefit by membership in a collective bargaining organization—a significant increase since a similar survey was made five years ago, when the comparable figure was a mere five per cent.

And an even greater number (66 per cent) said they believed their interests would be strengthened by membership in a non-bargaining organization, although many of the respondents pointed out that such an organization frequently is the first step toward outright unionization.

The results of the survey gave clear warning to industry and to the professional societies that steps must be taken, and taken quickly, if the engineer's hard-won public recognition as a professional is to be maintained, and, indeed, if the profession is to be saved from a descent to mediocrity and eventual classification as a trade.

The report, however, not only emphasizes the problem, but also points to some possible solutions; to methods of achieving a greater harmony and community of purpose between the engineer and his employer, and of strengthening the former's attitudes of professionalism.

The questionnaires probed even into the engineers' educational backgrounds, and it was there that a starting point was found.

The survey showed that sixty-two per cent of the employer group felt that their engineer employees were inadequately prepared in college to meet the tasks which lay ahead of them in industry, and to this, twenty-eight per cent of the engineers themselves agreed.

A cross-analysis of many of the thirty-six questions to which they were asked to respond showed that from this group came a very large percentage of the unhappy engineers —those who weren't quite sure how the boss felt about their work, who didn't think their prospects with the company were too rosy, and who in many ways exhibited a feeling of inadequacy.

It was made quite clear that something should be done, and quickly, about the curriculums of many of our engineering schools . . . that engineers should be required to carry more English, and social studies and the "humanities" . . . that, in short, those schools which have narrowed their curriculums to exclude, or dismiss with a modicum of attention, nearly everything, apart from purely vocational work, had better start turning out not merely engineers, but *educated* engineers.

Other needs which were indicated in the report are:

1. Readjustment of salary scales to provide more equitable compensation for the engineer who has been in industry for a number of years and who now finds that the pay raises aren't coming as fast as might have been indicated by the fat starting salaries.
2. A new approach to campus re-

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Report

(*Continued from page* 13)

cruiting, with a more realistic presentation of the industrial facts of life to the job candidate, who today frequently is "oversold" on the job and soon loses interest because it doesn't come up to expectations.

3. Differentiation in personnel policies as they apply to engineers and to non-professional employees. (Sixty per cent of the employers said they treated all employees the same.)

4. Encouragement by management of engineer participation in such prestige activities as writing and lecturing on technical subjects and participation in professional society and community affairs.

5. Improvement of engineer-management communications, both upward and downward, as recommended in Executive Research Survey Number One: "How to Improve Engineering-Management Communications."

6. Increased employment of supporting, sub-professional personnel for routine assignments to relieve engineers for purely engineering work, as recommended in Executive Research Survey Number Two: "How to Improve Utilization of Engineering Manpower."

7. Increased activity on the part of the professional societies toward the stimulation of professional attitudes not only among their own membership but among all engineers.

BLS Issues Report On Manpower and Costs In United States Industry

Scientific Research and Development in American Industry: A Study of Manpower And Costs is the title given to Bulletin No. 1148 just published by the Department of Labor's Bureau of Labor Statistics in cooperation with the Department of Defense. The 106-page bulletin is the final report on a survey of private companies and nonprofit agencies (other than educational institutions) engaged in research and development, which was conducted in 1952 by the Research and Development Board of the Department of Defense.

A preliminary report on the results of this same study was the basis of an American Engineer Special Report, appearing in the May, 1953, magazine. The new publication gives a more detailed interpretation of the information that was presented in the preliminary report, including data on the distribution of research engineers and scientists in U. S. industry, the use of supporting personnel, research costs per engineer and scientist, research costs as a percentage of sales, turnover among professional personnel, the influence of government contracts on industrial research, and the possible effects of military calls on professional research workers. In all sections of the report, separate figures are given for major manufacturing and nonmanufacturing industries and for companies of different sizes.

Copies of the bulletin may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for 50 cents each.

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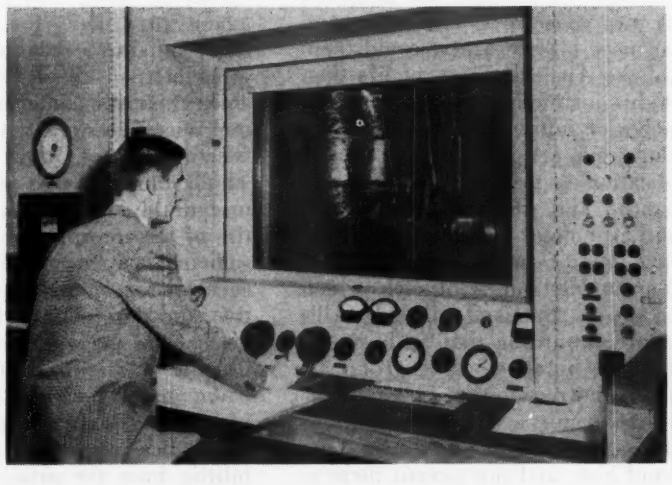
By

Clarence B. Randall

Assignment and Promotion: A Chapter From the Book *Freedom's Faith*



This chapter from Mr. Randall's recently published book is reprinted with the permission of the publisher, Little, Brown and Company, Boston, Mass.

Mr. Randall, leading industrialist and citizen, is pictured above. At left: Placement of new and young employees is equal in importance to selection, the author warns.

If America is great because our way of life tends to release the full potential of each individual citizen, then a statement of our national assets should begin with an analysis of our human resources. Instead of listing our items of physical wealth, we should begin with an inventory of the qualities of our people. We have the Paley Report, which tells us how we stand with respect to our reserves of things like petroleum, coal, and molybdenum, but there has been no similar study to determine whether our reserves of character, imagination, and leadership are dangerously close to exhaustion.

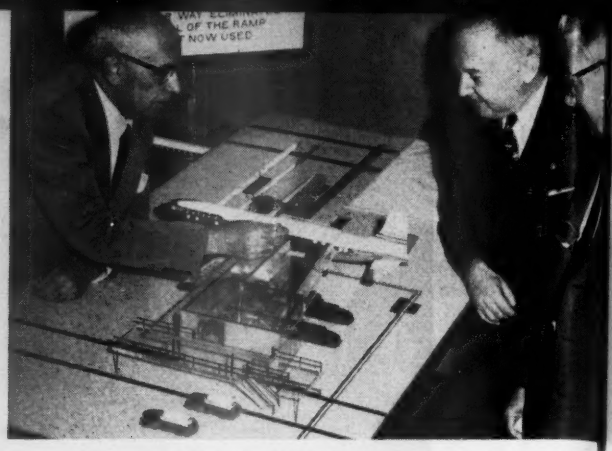
Men with Geiger counters are searching the most remote areas of our country to locate deposits of uranium in order that new sources of this marvelous energy may be made available to the next generation, but what are we doing to locate a Lincoln, a Woodrow Wilson, or a Churchill to inspire and guide each new generation? We have learned how to drill a mile under the surface of the earth and bring up hidden treasures, but what are we doing to pierce the depths of the human heart and lay bare its secrets?

This is the blind spot in business today. We have mastered machines but failed to understand men.

It is strange that this should be so, for we are intensely cost-conscious, as we must be if free enterprise is to drive ahead in its mission of ever producing more goods for sale at lower prices, but technical excellence is not enough by itself to give us the utmost in economy of operation. There are no machines so perfect that they are free of human control, and out of all of the elements entering into cost none are so important as the decisions taken each day by people, and about people. If those judgments about people are made wisely, the machine is free to function as its builder planned, but if they are made by men who have little awareness of the mysteries of the human heart, the machine will falter in its production, and no engineering test will reveal the cause.

The role of modern management begins and ends with an effort to discover and bring forth the utmost of capacity residing in the working and supervisory forces of the company.

If this is so, it is a rather strange anomaly that few men are brought to management positions in business either because they have had special training in dealing with the intangibles of human behavior, or because they have displayed unusual talents



Men in management positions need an over-all understanding and competence that is difficult to come by, according to Mr. Randall. Above, left, Edward O. Boshell, president and board chairman of Westinghouse Air Brake Co., listens to Albert M. Wiggins, vice president and general manager of the Union Switch & Signal division, explain an electroplating problem. At the right, J. D. Crichton, airport engineer for United Air Lines, points out features of his airdock design to W. A. Patterson, president, and D. F. Magarrell, vice president, Transportation Services.

in that field. This is still the age of the engineer and the physical scientist, even though the forces that retard productivity more often have their source in the conduct of people than in the nature of matter. At each echelon in the sequence of authority over the processes of production, preference is still apt to be given to the man with engineering training or experience. Technological competence must always be maintained at the highest possible level throughout a manufacturing organization, but we need balance. We need men with human competence as much as we need men with technical competence, and we must recognize frankly that the two qualities are seldom possessed in parallel degree by a single person. That would be a little too much to expect in this imperfect world. We must also be watchful lest we carry over into the field of human relations ill-suited analogies and figures of speech from the fields of physical research and engineering. You can draw a blueprint for a machine, but not for a man.

Wherever men and women associate themselves together for common action, whether it be in churches, political parties, universities, or business institutions, the same problems of organization have to be faced. Always there is the dilemma of how to preserve the power that flows from freedom and still give direction and focus to the enterprise. Inevitably the same fundamental compromise, which is the essence of democracy, results. The individual makes a partial surrender in the interest of unity, but does it voluntarily, reserving his ultimate right to withdraw when in his judgment the required compromise becomes too severe.

Those who sense with sure instinct the degree of compromise that they can and will accept become well-adjusted, as the phrase goes, and work well in groups. Those who cannot develop that instinct find that uneasiness and then unhappiness mount in their lives until they may withdraw and back into a social corner to be alone or with like-minded spirits. Of such were the hermits of the Middle Ages. They couldn't take life, so they withdrew from it. Of such today are those in all walks of life who seek to work by themselves, to have no boss but their own consciences and wills—and what more blessed aspect could there be of the American way of life than that this instinctive desire should be possible of fulfillment.

But group action must go on if our civilization is to maintain itself and advance, and the development of sound principles for its guidance is of the utmost importance. Nowhere will an understanding of such principles and a command of such skills be more rewarding than in business.

Implicit in all effective group activity is the recognition by each person that he must accept the limitations and weaknesses which he sees in those around him, and not permit them to blind him to the desirable qualities found in the same people. The common denominator required for joint action must be found in the good, in spite of the bad. This task is greatly simplified when each individual acquires sufficient humility to sense the great truth that others are likewise undoubtedly struggling to live with the limitations and weaknesses which they see in him, and that they too are seeking a common denominator.

Seldom in business can a man choose the people with whom he wants to work. Thrust into a particular job by force of circumstance, he is fortunate indeed to find even one person in his immediate group who possesses comparable skills to his in every particular, or who shares exactly his hopes and aspirations, both on and off duty. On the contrary, it is more than likely that he finds himself in rather intimate daily association with another human being possessing attributes which he regards as annoying. Day after day, he watches that parade of fantastic neckties, or smells that pipe, or listens to dull accounts of events in the other man's life that bore him completely. He grows sensitive to certain pet phrases — "contacted," "but definitely," "good-by now," "you can say that again," or "that's for sure." All the while he knows that the other fellow is in fact a skilled performer, and, since their jobs interlock, that nothing must interfere with the smooth functioning of the responsibility which they have in common. Tied inseparably together by the necessities of the enterprise, both must have sufficient patience and depth to see each other's strength in true perspective, and thus achieve the thrilling experience of becoming happy partners in spite of dissimilar personalities.

An important corollary of all this in business is that almost never does a man bearing management responsibilities have the privilege of leading a team which he himself has selected. Within the group which is given to him to supervise there is reflected the whole history of his company, in miniature. He must take them as is, the good, the moderately able, and the limited, and do the best he can. If mistakes were made in hirings or promotions, he is stuck with them; the man who made them has gone on to another job, or to retirement, and the present boss must make do with what he has inherited. But if he is half the man he ought to be he will resolve to make fewer mistakes of selection himself, he will use discharge reluctantly but courageously when conscience requires it, and leave a much better organization behind when it comes his turn to move along.

And that leads naturally into the question of how does a man who has been placed in the lead bring forth the full potential of the group?

He begins, of course, by taking inventory. He must find out what skills and talents are available, yet simple as that statement sounds it is disconcerting how inadequately it is done in industry. I have known men who could draw you to scale from memory an accurate sketch of a machine entrusted to their care, but who couldn't with confidence tell you even the name of the man who is running it, let alone give you a statement of his education, training, or degree of emotional stability.

Yet hidden away in the minds and hearts of those men beside the machines or behind the desks may be great wealth in undisclosed abilities if the boss will only make it his business to dig them out.

He finds out by being warm and human himself, by having a genuine interest in all that concerns each team member, by cultivating his subordinates off the job as well as on, and by setting up cross bearings through taking the judgments of others than himself about particular individuals.

Once this inventory of human resources has been carefully taken the alert supervisor re-examines his tables of organization with new interest and a sharply critical eye. He will become as conscious of human waste as he is of material waste. Where it is clear that a subordinate possesses talent or skills not finding full outlet in the job presently assigned to him, he will watch for a chance to give such a man responsibility more suited to his capacity. Often this has to be done without change in earnings or promotional status, but the man can be made much happier, and the effectiveness of the group enhanced. And if no such opportunity occurs in his own group, the supervisor seeks opportunity elsewhere for such a man by talking with associates of parallel responsibility. He thus demonstrates that the worker is in his eyes a person and not a number.

The inventory of human resources will disclose not only proven abilities that are unemployed, but will also bring to light new abilities in men that otherwise have been passed over. There again is the real pay dirt in a searching study into the capabilities of a group, and the one which should rouse the keenest sense of challenge in the supervisor. What can be more satisfying than to be the medium by which some other person is brought to glimpse new possibilities for his own achievement?

There are many tools with which the supervisor may go quietly to work to develop the latent abilities of a subordinate. The facilities for adult education, which are now so abundantly available throughout the country are, of course, high on the list. The young man who has had general education only, and who feels at a competitive disadvantage with his technically trained associates, can overcome that handicap somewhat by night courses in chemistry or electrical engineering; the metallurgist who feels tongue-tied when it comes to making verbal or written reports can study speaking or writing; and the accountant who has worked with statistics but not with people can plunge into the subject of labor relations. The thoughtful boss can suggest all these things and then watch carefully the impact of new intellectual adventures upon those involved. He can in particular thus determine whether they have the courage to tackle something for which they were not trained, and the perseverance to see a tough assignment through.

But over and above further formal education, there is available the important working tool of change in duties and responsibilities. The utility of learning by doing is obvious, as is the complementary advantage to the supervisor of testing character and ability under varying circumstances. To take a man out of one sequence and jump him into another where the duties are different, and the risk of failure substantial, takes executive courage and insight, but it is a marvelous technique for developing those who seem to have promise. I call it horizontal promotion. The man himself cannot bring it about, wistful though he may be to have a chance at something different. A boss with daring and imagination attempts it; one without those qualities lets seniority and accident govern placement, takes no risks for the sake of development, and upon his own retirement bequeaths his successor nothing but a miscellany of assorted specialists, no one of whom is capable of assuming broad responsibility at the point where the separate sequences inevitably converge. In the field of human endeavor, I have found that such transplanting fosters growth.

Management's most important incentive is promotion. Clearly this must always be done on merit, and merit alone. Among men of equal ability, length and loyalty of service should be given great consideration, but they must never govern absolutely. In a system of free enterprise each organization must at all times give its utmost to the service of the public, and if this is to come to pass there must never be any compromising on the question of ability. The best man available must always be given the job. With his inventory of human resources before him, and his program of individual development kept up to date, the supervisor must give the promotion unqualifiedly to the person most likely to bring out the best joint effort from those entrusted to his charge. If wise, he will plan his promotional steps long in advance, having alternate solutions in mind to suit the contingencies which the accidents of life may bring about. This means planning in depth, with two or three steps ahead in his mind for a man of promise, who should not get shunted off into a dead-end sequence.

Such planning in depth, moreover, requires skill in appraising human capacity, and firmness in judging when each subordinate has reached his ceiling of achievement. There seem to

This is still the age of the engineer, says Clarence Randall in his new book. Shown below are Northrop Aircraft engineers Leonard Nalley and Lee Beydler, two of the many thousands who make possible our technological progress.

be promotional limits for each one of us. Wise indeed is the man who recognizes this both as to others, and as to himself. Much unhappiness can be caused, and tension created within an organization, by the hearty back-slapping boss who promotes a man because he likes him, without adequate insight into his capacity, and then has to back away from his decision after a period of dismal trial and error. Another too common case is in underestimating the capacity of youth, and yielding reluctantly to the claims of seniority. The only safe guide is promotion strictly on merit every time, based on searching inquiry into the qualifications of all eligible candidates.

Promotion presents the further question of whether each new opportunity should be given without exception to some person present in the organization, or whether a company should occasionally "go outside." Again a sense of balance is required. Certainly the company which always fills an important post by enticing a man away from a competitor reveals itself as bankrupt in personnel policy, and indifferent to its social responsibilities. The development of our human resources is a task which all should share. On the other hand, we all know of companies that have become inbred. It doesn't seem altogether sound to me to boast as some companies do that "when the chairman retires, we hire an office boy." The crossbreeding that comes from introducing occasionally a man with a fresh point of view and a sharply contrasted set of traditions can be very salutary.

No program of development, though well conceived and executed, can be altogether satisfactory, however, if the group itself was not well selected. Intelligent hiring is the bedrock upon which all sound personnel programs must be built, by which, of course, I mean hiring plus initial placement. Brains will not come out at the top of an organization unless they are put in at the bottom. This is now universally recognized in the leading companies, and the search for brains and character is becoming a highly significant aspect of the competitive process. Young men and women of promise, those radiant youngsters that we all like to see around us because they are so obviously "going places," never have to look for a job these days. They choose from many offers, and I am bound to say I think they do it with a much finer instinct than my generation did. They have their eye on the long pull. They will not be deceived by a high starting pay, if there is something about a company they do not like. Such prospects must be actively sought out, and must be recruited on the basis of the general reputation of the company. Organizations which do not get their share will begin to stumble for lack of leadership in about twenty years.

Placement is equal in importance to selection, however, and if each new employee is discerningly assigned to the task best suited to his apparent ability, there will be less human wastage. The exceptional person will be given the continuing challenge that his inner drive requires, and at the same time the skills of those of more moderate ability will find full usefulness.

Astonishing things are being done today in utilizing the capabilities of the physically handicapped. Here are men whose known limitations do not prevent them from being highly useful. With equal understanding similar success can be reached in the placement of those whose handicaps are not physical but psychological. Surely our goal must be to use to the full all of the nation's human resources, for by so doing we will simultaneously increase production and foster human happiness.

But if intelligent hiring is important, so is intelligent and courageous firing. If voluntary group action based on leadership is the source of the dynamism of our society, those who fail must be removed; otherwise the full potential of the group will not be achieved. We must not let the inadequacy of one block the competence of many. All people bearing responsibility know this, but it is human to avoid taking the final decision. To impose descipline of any kind is unpleasant, but to sever a relationship that has existed for a long time and that has bred warm friendship brings deep emotional disturbance to the one who must decide. For that reason delays usually occur, delays that far exceed the reasonable doubt that is due to seniority, and delays that are prejudicial to the institution. It must be remembered, too, that delay injures the person to be fired. If the severance is inevitable, the sooner he is told of his defects, the more time remains for him to make a change; and many a successful man will testify that his whole life was benefited by the shock of being fired from his first job.

In this entire range of problems one quality seems to be required for the development of the full power of any group who are associated together in a joint effort for a common end, be it a business or an army. Whether we are the supervisor or the supervised we need a sensitive awareness of the impact of the words and actions of each person upon the conduct of others. This begins, of course, with ourselves. To the extent that we can observe objectively and critically the influence our own actions have on those about us, we can set out consciously to eliminate the harmful and strengthen the good. Having acquired some proficiency in this respect in our own conduct, we may then hope to bring improvement in the lives of those others for whose welfare we are responsible.

The businessman, however well-intentioned, is for the most part an amateur in these subtleties of human nature. But no longer can he survive in the modern competitive pace if all he knows is knocking heads together. The other company down the street will steadily outdistance him, and he will never understand why. On the other hand, if his sensitivities become aroused, and he begins to glimpse the tremendous management possibilities that lie in the development of people, he will sense with humility his own shortcomings, and seek consultant guidance in this field, as he has always done in engineering and physical research.

His consultants will be the trained psychologists and psychiatrists, the men who have devoted their lives to the study of human behavior, and who are just beginning to win the place that they deserve at the industrial conference table. The analogy to engineering is inept, for theirs is no exact science. They deal solely with intangibles, and their methods of approach differ widely, but that very diversity offers the hope of progress.

One thing is certain. They do know a lot about people, as any management man will discover who will place his problems before them. And above all, they will tell him much about himself.

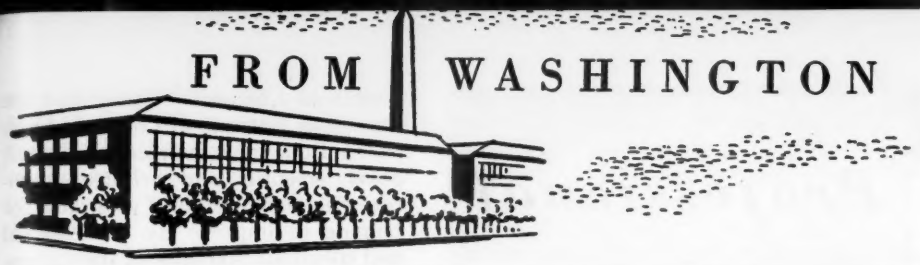
Knowledge of people will be the watchword of business in the years that lie ahead.—***End.***

About the Author . . .

Clarence B. Randall — administrator, author, and lawyer—is a graduate of the Harvard Law School. He practiced law in Ishpeming, Mich., from 1915 to 1925 before becoming associated with the Inland Steel Company of Chicago, of which he is now chairman.

He has long been prominent in civic activities and has recently been named by President Eisenhower to head the Commission on Foreign Economic Policy. He made headlines around the world on April 9, 1952, with his radio-TV address, "These Are the Facts, Mr. President," following Government seizure of the nation's steel mills on order of President Truman.

Mr. Randall is the author of numerous magazine articles and several other books, including the popular *A Creed for Free Enterprise.*



Milton F. Lunch,
By
N.S.P.E.'s Legislative Analyst

DOES "TECHNOCRACY" THREATEN THE MILITARY?

Webster's New International Dictionary (2nd ed.) defines technocracy as: "Government or management of the whole of society by technical experts, or in accordance with the principles established by technicians."

The quoted definition is pertinent because a high-level committee of admirals and generals (known as the Womble Committee) has submitted a report which indicates its concern that the military organization is being taken over by technical personnel. In at least two references, the military committee mentions an increase in "technocracy" within the services, and presumably they mean just what the definition says, rather than an increase in technology. The latter obviously has increased in recent years as the military has kept pace with scientific and engineering advances in equipment and arms.

The Womble Committee was appointed after much concern had been expressed about the problems involved in making military service an attractive career. The committee's report deals with "the future of military service as a career that will attract and retain capable career personnel." Among the many findings and recommendations, two have a particular relationship to the engineering profession.

First, the committee reports that "technocracy has been over-emphasized to the detriment of command ability." The report states: "The services must overcome the dilution of military authority and leadership by adjusting promotion criteria. A premium must be placed on command leadership abilities. Accompanying an increase in technocracy within the services, there has been an ever-increasing demand for technical abilities. As a result, many now achieve promotion to responsible positions never placing themselves in a situation where their leadership and command abilities are tested. It must be clearly established that military command and technical astuteness are two separate and distinct fields of endeavor. Both are essential, but career personnel must be reassured that leadership ability will be recognized in promotion procedures."

Perhaps the best case example of what the committee is talking about is the Rickover Case (American Engineer, April, 1953) which dramatized the differences between those who would restrict career advancement to "command" personnel and those, such as Representative Sidney R. Yates, who, in taking up the cudgels for Captain (now Rear Admiral) Rickover said, "recognition should be accorded to officers who are scientists as well as those who are fighting men . . ."

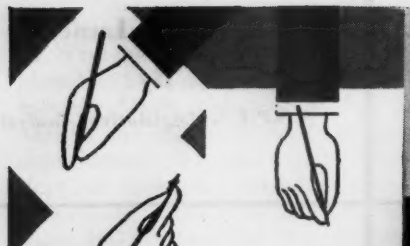
The second interesting comment of the Womble committee deals with "increased competition with industry for good men." The military group states:

"The advent of modern weapons in our Armed Forces has brought about an increasing technocracy accompanied by an overwhelming demand for skilled technicians in all trades. Because of our inability to hold career personnel in highly technical positions, the Armed Forces are forced to give costly training to thousands of personnel who immediately leave the service for the more lucrative rewards available in industry. One of the greatest savings to be made in our national defense effort lies in enhancing the ability of the Armed Forces to compete with industry to retain highly skilled technical personnel. The committee therefore contends that no additional cost is involved in additional recompense for career personnel since, over a period of time, such costs are more than offset by decreased costs of training, recruitment and separation."

Reading these two sections of the report together raises some obvious questions: if it is "bad" to place those with only technical abilities or experience in "responsible positions," as the first statement implies, how can the military hope to counteract the appeal of industry which is always on the lookout for technical ability and holds out the promise of opportunity for achieving "responsible positions?"

It may well be that the apparent contradiction can be explained in terms of two administrative or promotion systems or some other administrative devices to accomplish both objectives at the same time. An appendix to the report which repeats that "technocracy is overemphasized to detriment of command ability," indicates such suggested action as study by the military departments to distinguish between command and technical responsibilities and states that the Army and the Marine Corps are preparing plans to distinguish between technical and command personnel by separate insignia.

The Joint Chiefs of Staff are reported to have developed over-all major policy plans for the military, termed the "new look," which will result in reduced manpower and greater combat effectiveness by use of newer and better weapons and equipment. If so, and Secretary of Defense Wilson has indicated the same thoughts, it would appear that the military will have to concern itself more with obtaining, holding and recognizing the scientists, engineers and technicians who will be needed to develop, operate and maintain the more complicated equipment than in ways to establish a cleavage between the "technical" group and the "command" group.



Professional POSTSCRIPTS

This is your department. Your contributions to it are solicited. We want your views on subjects that affect the engineering profession directly or indirectly. Please keep your contributions short, and remember that editing may be necessary to conserve space. Your name may be omitted if you desire. — *The Editor.*

Greetings once again and best wishes for a wonderful New Year! First out of the mail bag this month is a clipping from Col. Michael J. Blew, prominent member of the District of Columbia Society of Professional Engineers and NSPE. The clipping is of an article entitled "Chemists Are Human Beings" by S. D. Kirkpatrick, and it first appeared in the magazine *The Chemist*, of the American Institute of Chemists. Col. Blew's instructions: "Just substitute the word 'engineer' for the word 'chemist'." O.K., Colonel, here we go.

—PP—

I keep six honest serving men
They taught me all I know
Their names are How? and When? and Where?
and What? and Why? and Who?
—Kipling

I have a confession to make. I am more interested in chemists than I am in what dear old Professor Noyes used to call "our beloved science of chemistry." Perhaps I'm peculiar, but I've always found more personal satisfaction in people than in things. I feel that when I know the answer to Who? then the How and the When and the Where and What and Why are usually rather easily disposed of.

About twenty years ago I made a speech at a banquet during the St. Petersburg meeting of the American Chemical Society. At the time I thought it was pretty good and was rather disappointed that no journal, not even "Chem. & Met.," saw fit to publish it. Perhaps the reason was that I had titled it, "Are Chemists Human Beings?" Or maybe it was because I didn't quite answer my own question—at least to the editor's satisfaction.

Anyway, I proceeded to prove, or thought I did, that while we had all done a pretty good job in selling the world on the wonders of chemistry, the chemist remained a mysterious, misunderstood, miserably underpaid scientist. Too often in those dark days of the great depression, chemists and engineers were regarded as mere chattel to be hired or fired with every change in the business cycle.

With some temerity, I told my audience that the biggest, most serious problem before the American Chemical Society at that time was "to enhance the professional standing of the chemist—to prove that he is or can be a useful, respected member of society."

In good Dale Carnegie fashion, I asked the rhetorical and oratorical question: "Who is responsible for this sorry state of affairs?" I was frank to admit that to some extent the chemist himself was to blame. He was more interested in his work than in the profits from its results. He was better satisfied with getting a paper on his research published in five foreign journals than in getting a salary that ran into five figures. Too often he would rather bestow his affection on his beloved science than on his fellow men who go to make up the society in which he lives and works.

But, at that time, it seemed to me that an even larger share of the responsibility rested with our professional and scientific societies. I indicted them on the score that "they have been occupied so much with advancing science and industry that they have overlooked the fact that the work is done by chemists who are human beings, who must eat, wear clothes, buy shoes for the baby, and occasionally go to the movies."

All that, I'm now glad to say, was almost twenty years ago. Since then there has been a great advance in the professional, economic and social status of chemists and chemical engineers. The American Institute of Chemists has been in the vanguard of that procession. But, in all fairness, we should give abundant credit to our sister societies — particularly the American Chemical Society and the American Institute of Chemical Engineers. Both have supplemented their purely scientific and technical activities with well-organized programs for helping to improve the professional and economic standing of their members.

There is still work to be done. In my opinion, the chemical profession as a whole could benefit immensely from an over-all program comparable to the Engineers' Council for Professional Development. That organization, you will recall, was established some years ago by the major engineering societies as a joint effort toward improving the professional capacity and standing of the individual engineer. It is primarily a self-improvement plan. It has been called a cradle-to-the-grave program in that it begins with guidance activities for high school students, carries through the accrediting of engineering college curricula, and follows the young engineer into post-graduate and training-in-industry courses, finally leading to professional recognition and competence.

It's a long-time job, but exceedingly worthwhile because it deals essentially with the personal problems of the individual engineer. I guess that's why it appeals so much to me.

"How Am I Doing"

That, incidentally, is the title of an excellent little book by an old friend of many of us, Robert F. Moore, the management consultant who was formerly placement director at Columbia University. The subtitle of Bob's book is "Self-Appraisal for the Aspiring Executive." It's addressed to the young man or the old-young man with a strong urge to go places. Here are some of the chapter headings: How Long Is a Rut? Salary Symptoms, Greener Grass, The Boss and I. The final chapter, which appealed most to me, is headed, "Friends Unlimited."

Bob starts off that chapter with this quotation from the famous "Million Dollar Lecture" which Prof. Erwin H. Schell gives his Course XV, M.I.T. graduates each year:

"I will measure the rate of achievement of your future success largely in terms of your ability to find, make and keep friends. I'm confident you will fit on the job for which you have been trained. But your greater opportunities will come only after you have proved your ability to fit in the organization, and to fit in an organization is to find your place among friends."

Psychologists tell us that the basic human needs of mankind are not all

concerned with food, clothing, health, and shelter. There are emotional hungers that are just as real as physical hungers. They must be satisfied in every life from the lowliest to the very highest.

If you're interested, I can tell you what I learned about these emotional needs from a lecture course I took in elementary psychology at the Maplewood High School for the Adult Education of ignorant editors, chemists, and other underprivileged citizens. I think the teacher called them the Thomas four wishes. Here they are:

First was Recognition. People like to be noticed, to be recognized as being good at something. If no one pays any attention to you, you can become unhappy — no matter where you are on the ladder of success.

Second is Security. People also like to be accepted, to belong in the company of other people they respect, to hold on to what they have.

Third is New Experience. The desire for change, for novelty, for greener pastures.

Fourth, and I was glad to see Bob Moore rated it the one need that is all-inclusive—is the need for friendship. Thomas calls it Response, and varies it all the way from friendly acquaintance to love and affection.

Had I been smart enough to have studied psychology in college, I might even have been one of Moore's aspiring executives instead of a perspiring editor. But even at this late date, I find my newly acquired knowledge mighty useful. I've discovered that most men don't take off their human emotions with their overcoats when they come to work in the office, plant or laboratory. Whether they are fellow employees or bosses, customers or suppliers, they have the same human needs for recognition and response. And friendship, of course, is a two-way street. It's awful trite, but true, to say that he who would make friends must himself be friendly..

Please get me right on this. When I'm talking about friends I'm not thinking about so-called business contacts — acquaintances made for purely selfish purposes. Such friends seldom last. I'm talking about the friends you make and keep over the years, primarily for the sake of friendship itself. They are the ones who will add to the fun and satisfaction of your life. They become part of your fortune—in fact, your most priceless possession. "Without the love of friends, the richest man is poor indeed."

I'm not going to tell you how to make friends and influence people. You can buy Dale's book—as I did. But I'm going to pass along this advice. There are no better places to make friends than in our professional societies. You should not only join but you should participate in their activities. The friends you make as you jointly shoulder responsibilities in these organizations will pay you more generous dividends than you will ever get on any other investment of your time and energy.

That brings me to a final thought I want to leave with you. This time I'm talking to my contemporaries here in the bald-headed row.

I know I shouldn't admit it, but sometimes I seem to write my best speeches in church. Last Sunday the Minister reminded us that all of life — whether for the individual, the community or the nation—seems to follow three stages of development. First, there is the period of dependence when we must lean largely on others. Then comes the period of self-assertion, or independence, and finally, a period of cooperation when we can share our competence and experience with others.

I could not help but think of the parallel with our professional progress and responsibilities. The young graduate as he strives to make a mark for himself in his chosen profession is obviously dependent upon others for guidance, whether by precept or example. To belong to his professional society gives him a feeling of security while he's struggling for recognition and reward. As he reaches professional maturity he may become more or less independent of the help he can derive from his society. But if he's really wise he will have learned by that time that the more he puts into unselfish work for his fellow men, the more satisfaction will come from his efforts.

Finally, when we get into our fifties and sixties we begin to realize that our greatest responsibility is to share with others what we've learned along the rocky road to professional progress. So, to the younger members of the Institute who can and must carry the torch in the years ahead, I pledge you my support and that of my contemporaries. On their behalf, as well as my own, I accept this honor as a challenge and reminder of the debt we all owe to our profession.

—PP—

Another dip into the mail bag and we come up with an editorial that appeared in a recent issue of the *Mid-West Contractor*, a trade journal published in Kansas City. It was sent to us by J. O. Armstrong, P. E., City Engineer of the City of Kansas City, Kans., and a member of NSPE. Engineer Armstrong says: "I believe it is one of the best articles regarding proper pay for engineers in municipal work that I have ever read."

—PP—

For some time now we have been writing about the various problems of the construction industry; trying to do our part in pushing for more and better highways; trying to get millions of dollars back into construction. This month, we are deviating just a bit. There is another segment of the construction industry that deserves our attention and action. We are referring to the underpaid civil engineer. The various States are attempting to hire first class men to do a creditable job but will not pay enough to make the job attractive. The highway engineer is a necessity unless we are willing to let our roads go to pot. He designs better highways, streets, sewers, waterworks and bridges for our convenience, and, most important, for our safety.

We read about billion dollar turnpikes, new highways, millions for surveys to solve traffic jams, record-breaking production by car manufacturers. Yet how many realize what it means in "engineering know-how?" To many, blue prints are produced by pushing a button.

We of the construction industry know that there is a serious shortage of engineers existing in the state highway departments today. The main reason for this shortage is inadequate salaries. A recent survey by the American Road Builders' Association dis-

(*Continued on page* 35)

Idaho Society of Professional Engineers—Annual Meeting. January 15, 16. Boise, Idaho.

Kansas Society of Professional Engineers—Annual Meeting. January 22, 23. Jayhawk Hotel, Topeka, Kansas.

Texas Society of Professional Engineers—Annual Meeting. January 28-30. Corpus Christi, Texas.

Wisconsin Society of Professional Engineers—Annual Meeting. January 28-30. Schroeder Hotel, Milwaukee, Wisconsin.

NSPE Spring Board Meeting—February 18-20. Hilton Hotel, Albuquerque, New Mexico.

Professional Engineers of North Carolina—Annual Meeting. February 25-27. Washington-Duke Hotel, Durham, North Carolina.

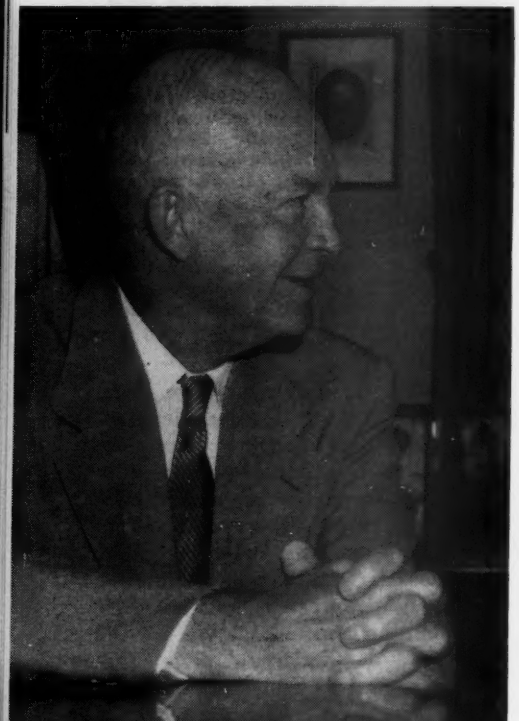
Georgia Society of Professional Engineers—Annual Meeting. February 27.

Ohio Society of Professional Engineers—Annual Meeting. March 26, 27. Mayflower Hotel, Akron, Ohio.

Nation's Engineers Prepare for Outstanding National Engineers' Week; Eisenhower Issues Message

WITH the issuance of a special message to the Nation's engineers by President Eisenhower, interest in National Engineers' Week reached a new high as NSPE groups across the country planned their celebrations.

The Week, to be observed this year February 21-27, was spoken of by the President in these words: "I heartily endorse this recognition of the engineering accomplishments of our Nation's first President, and I am delighted to use this occasion to pay compliments to America's engineers."



The complete message of the Chief Executive as written to Mr. T. Carr Forrest, Jr., P.E., NSPE President, will appear in next month's Special National Engineers' Week issue of the AMERICAN ENGINEER.

The National Engineers' Week Committee urged the States and Chapters to lose no time in ordering promotional aides from National Headquarters. (*See opposite page*). The 5-minute TV sound film features a "Pilgrimage to Mount Vernon" with United States Senator George Malone of Nevada, the only professional engineer in the Senate, and NSPE President Forrest, taking part. The show can be used alone or as part of a longer TV program.

One radio show on tape (*#2 on opposite page*) is a documentary which reviews the wonders of modern-day engineering. It is done by a professional NBC announcer and radio actors. The other show (*#2a on opposite page*) is of the panel type and features U. S. Senator George Malone; A. A. Potter, Dean Emeritus of Engineering, Purdue University; and NSPE President Forrest.

Committee Head Gruehr Issues Statement

Anatole R. Gruehr, P.E., Chairman, National Engineers' Week Committee, has issued the following statement to all who are promoting programs in the field:

"The theme for the coming National Engineers' Week is "Engineering—Builder of a Strong America." It is a theme that is particularly timely in view of the popular interest in our national military and industrial power, in preparedness for things to come. It offers excellent opportunities for industrial displays and industrial advertising. It also offers opportunities to honor organizations and individuals responsible for the development and production of new equipment vital to national defense.

"All Chapters have received copies of the National Engineers' Week Kit, which contains many valuable suggestions on methods and techniques of organizing the activities in each area. In many communities it may be possible to hold a meeting based upon some appropriate feature of the celebration. It would add weight to the meeting if it can be held jointly with other organizations, such as other engineering societies or civic groups. Honoring individuals or organizations for outstanding services toward national defense may provide a focal point for such meetings.

"Many, if not most, engineering colleges have been engaged in research and development work on defense projects. Certain members of their staffs may have done specific work worthy of citation. In all cases, we should honor engineering colleges for their major contribution of training men needed for building a strong America.

"The essence of our national strength is the freedom we enjoy as individuals and as members of the engineering profession. The most outstanding achievements are due to this freedom—the freedom to originate and to work out new ideas; to attempt what others regard as impossible. Engineers must zealously guard the freedom of their professional endeavor if our nation is to retain its leadership in production and scientific development. This is the basic philosophy underlying the celebration of National Engineers' Week."

P.E. PUBLICITY CHAIRMEN

YOU have a date for FEBRUARY 28th!

That's the time to send your Engineers' Week story to the *American Engineer*.

As usual, space will be limited but we will give as wide coverage as possible. So get the news of the week's outstanding events in the mail EARLY.

FEBRUARY 28th is the day to do it!

National Engineers' Week is a program sponsored nationally by the NSPE. It is YOUR big public relations effort of the year.

Help Now!

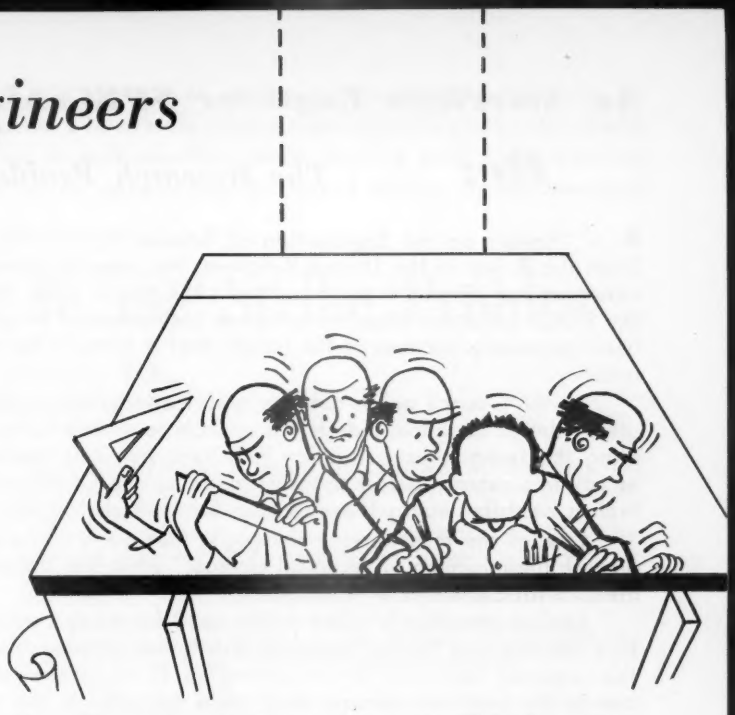
Are you helping your Engineers' Week Committee in its work to carry out a real program? Why not act now to participate in the important work of telling the public about engineers and their profession?

National Engineers' Week
—1954—
Best-Yet

Special For Busy Engineers

Here are some handy, ready-made aids to help you put Engineers' Week over in your City! Priced at less than cost, they cover radio, television and the newspapers. Order the ones you want from NSPE Headquarters now! (Pass this page along to other members of your Engineers' Week committee for their information.)

NSPE knows that officers and members of its chapters are busy men who, despite their keen interest in engineering professionalism, have limited time to devote to National Engineers' Week. That's why NSPE has made these professionally-written and produced aids available to you — *at less than cost!*



1. (For television.) A five-minute sound motion picture, "Pilgrimage to Mount Vernon." U. S. Senator George Malone of Nevada and NSPE President T. Carr Forrest, Jr., comment on the distance engineering has traveled between Washington's day and now. Filmed at Mt. Vernon and narrated by an NBC announcer, this film can give visual variety to your panel discussion or other TV shows or can be run independently. Price, $35.

2. (Radio show on tape, 15 min.) A documentary which reviews the wonders of modern-day engineering. Produced by a professional NBC announcer and radio actors. Price, $6 each.

2(a). (Radio show on tape, 15 min.) A panel discussion on engineering problems featuring U. S. Senator George Malone; A. A. Potter, Dean Emeritus of Engineering, Purdue University; and NSPE President T. Carr Forrest, Jr. Price, $6 each.

3. Newspaper feature on a mat. This feature article devoted to engineering achievements has been set up in type and has a dramatic picture with it. Prepared by a leading newsman, all you have to do is to take it to your newspaper and it's ready for insertion. Saves the paper money because it doesn't have to set type or make engravings. If you have several newspapers in your town, you might want more than one. Price, only 50¢ each.

4. Engineers' Week Posters. These attractive posters make excellent bulletin board, window, and other displays. Six given free in kit. To cover part of the cost of the program, a charge of $4 per 100 is made for extra posters.

5. Engineers' Week Seals make splendid adornments for your letters. Price, $3 per 1,000.

6. A logotype (metal cut of seal) to insert in advertisements, printed matter, etc. Price, only $1.50 each.

PLEASE CO-OPERATE BY ORDERING YOUR AIDS EARLY

postage free, self-addressed envelope enclosed

National Society of Professional Engineers
1121 Fifteenth Street, N. W.
Washington 5, D. C.

Sirs:

Please rush me items indicated. I enclose a (check .....)

(money order .....) in the amount of $.....

I understand remittance must accompany order.

Name .....

Address .....

City ..... State .....

- ☐ 1. TV film @ $35 ea.
- ☐ 2. Radio tape, "The Engineering Story" @ $6 ea.
- ☐ 2a. Radio tape, panel discussion, @ $6 ea.
- ☐ 3. . . . .(copy) (copies) newspaper mat @ 50c ea.
- ☐ 4. . . . . copies of Posters @ $4 per 100.
- ☐ 5. . . . . copies of seals @ $3 per 1,000.
- ☐ 6. . . . . logotypes @ $1.50 ea.

An *American Engineer* SPECIAL REPORT

Re: The Research Problem in British Industry

● A "Report on the Exploitation of Science by Industry," published by the Advisory Council on Scientific Policy in the United Kingdom, has recently come to the attention of the American Engineer. Based on the 12-month period, April 1952-March 1953, the report offers a brief but telling picture of the British industrial situation as far as technological progress is concerned. It is of interest to engineers especially because of the insight that it gives to the role of the profession as an element of British industry.

As the Council points out, the report attempts to analyze the reasons behind the comparative failure of United Kingdom industry as a whole to exploit to the full the results of scientific research. Evaluating the technological situation in Britain, particularly against that found in the United States, as well as to some extent against progress made on the Continent, the Council finds a number of well-defined factors contributing to the admitted British technical lag.

One of the most serious charges is that many of the country's large firms "appear content to carry on with the minimum of technical change," while this complacent attitude is even more in evidence in medium-sized and smaller companies.

Special attention is called to the need for many more qualified engineers and scientists in the country's industry and for the improved distribution of available technological manpower. The report cites the apparent failure of British universities to place enough emphasis on the training of applied scientists in the past, but remarks that, while this reflects the schools' previous remoteness from industry, it also highlights the fact that industry and commerce generally had little demand for such men.

In addition to the fact that British industry itself must give increased recognition to the importance of engineers and scientists and thus create and foster a demand that the schools will perforce meet, the desirability of having more technically trained men in management is stressed by the report. "It is no accident," the Council states, "that the enormous growth of American production has coincided with an increasing representation in management of men with a strong scientific or technical background. It cannot be too strongly emphasized that unbalanced boards of management, on which technical representation is small or non-existent, are unlikely to be able . . . to take full advantage of the results of scientific research with the speed and enterprise which are required under modern conditions."

The pattern of British production must also be changed to meet modern challenges, the report asserts. New processes and products must be developed by the application of scientific and engineering skills in order to insure economic survival in the increasingly competitive world.

Finally, the level of investment in the manufacturing industry is criticized as being far too low, and again a comparison is made with the situation in the United States—"With their labor force in manufacturing industry only twice ours, the Americans now spend five or six times as much as we do on new plant and equipment, i.e., the equivalent, at its face value of about three times as much per person employed."

Government investment controls, current monetary values, and high taxation are noted as items contributing to this situation; and the Council calls particular attention to the shortage of risk capital, most of which is going into relatively safe forms of investment. "Industrialists," the Council states, "no doubt do the best they can with the financial and other resources at their disposal, and the projects they decide to advance are those which they consider will today yield the best returns. In the process many promising ideas must become casualties, and conflict may well arise between what may be regarded as immediate commercial advantage, and potential national good."

The report briefly covers steps that might be taken to narrow the gap between scientific discovery and industrial output, pointing out the value of research associations whose work complements that of individual firms and also the advisability of extending the use of Government-sponsored research and development contracts.

While the less favorable aspects of the British technological picture are underscored in the report, the Council is also quick to point out that there are firms "as scientifically-minded and as progressive as their counterparts in other countries," and that "there is no fundamental technical reason why others should not emulate their example." It is interesting to note that the report states very specifically that engineering firms in particular could not remain in business if they were not at least as up-to-date as their overseas competitors.

It is obvious from the report that the engineer is gaining greatly in stature in Britain today as it becomes more and more apparent that the future of the economy will depend very largely on his contributions. "Every industrial undertaking," it is stated, "must necessarily examine a variety of considerations before deciding how to invest such resources as may be at its disposal. In the field of new discovery, whether of improved processes or new products, such decisions are likely to be in the right direction the more they are entrusted to scientific and technical men."

As a postscript to the report, it is interesting to note that increased Government support for scientific and industrial research in the United Kingdom has recently been announced by Sir Ian Heilbron, chairman of the advisory council for the Department of Scientific and Industrial Research. Speaking at a conference of research associations meeting in London, he stated that he had been informed the British Government intended to allow the department to resume full-scale development of its plans for postwar expansion and was going to permit it to schedule research broadly on a five-year budget.

Editor's Note: Some months ago, this magazine published an article on labor-management relations by Benjamin F. Fairless, Chairman, U. S. Steel Corporation. The article caused considerable comment, much of which has already appeared in the magazine. Below is still another piece dealing with this pressing problem. Engineer Kelly feels that at least a portion of the answer may be found within the engineering profession.

An Engineering Solution to the Strike Problem

BY PILSON W. KELLY, P.E.,
Member, NYSSPE and NSPE

We have been told with complete sincerity that we cannot survive with labor-management strife; that the basic trouble is our failure in human relations; that the problem is a challenge to our finest minds, and its solution will demand infinite patience and endless perseverance.

If accurately represented, this is a sad state of affairs. However, the solution of any problem is locked up within the problem, and the key to solution is entirely a matter of method—method of approach, which is largely analysis, and method of procedure, which is largely synthesis.

There is evidence that the strike problem defies solution only because we are not applying proper method to it. There is evidence that very ordinary, indeed the standard, engineering method is capable of taking this problem under complete control. It is the purpose of this article to present some of the evidence. You are invited to judge for yourself. The method of approach is vital, and the place to start is at the situation as represented to us.

The Strike Situation as Represented

There seems to be no doubt that free enterprise as we have known it cannot survive unless industrial warfare, such as the large-scale steel strike, is eliminated. But if the source of the trouble is really in human relations, then the outlook is gloomy. If our salvation depends upon changing the nature of man, our position is hopeless, for history convinces us that man's nature hasn't changed much in 5,000 years; and 5,000 years of history is largely the story of man's effort to understand human relations, though at times, the trouble is that men understand each other too well.

Naturally, if the strike problem really has its source in such unsatisfactory fields as these, it is truly a challenge to our finest minds, and there it is likely to remain while our way of life marches to oblivion.

The engineer, however, has some effective automatic defenses against failure, and it is difficult to lead him down such mournful paths. The engineer, at times like these, slams on brakes, reverses engines, and seeks more promising alternatives. He instinctively sniffs for absurdity, vagueness, defective definition—and the very term "human relations" comes under his skeptical scrutiny, and soon becomes suspect. The lack of identity, the lack of known laws, the absence of proof, all prejudice him against it, for to the engineer, these lacks have always been the harbingers of trouble, defeat and sorrow.

Let us focus our glasses upon the strike demon and see whether we can't track it to a more tangible lair than human relations. If we can find a tangible target, the guns of engineering method are capable of demolishing it..

The Focal Point of Difficulty

There is no doubt that the essential ground of difference between labor and management is simply that the two parties have opposite views of the nature of a dollar. Labor's view is that all dollars are not the same simply because some Government printer printed them off the same plate. Dollars are different because they behave differently in a grocery store or in a shoe store. The 1954 dollar behaves differently in its essential nature, purchasing power, from the 1940 dollar, and the remedy is simply to obtain more of the 1954 dollars in the pay envelope to compensate for the change in quality.

Management, however, is under certain compulsions to treat all dollars the same, regardless of purchasing power. Some of the most prominent industrialists and financial technicians in the country believe that this policy is actually dissipating the capital of individual corporations by as much as 200 million dollars a year; and that in heavy industry, including steel, income taxes are being grossly overpaid. What is possibly more important, less famous people have offered *proof* that this policy results in large scale dissipation of capital and grossly overpaid income taxes, *under the existing Internal Revenue Code.*

Thus heavy industry is caught in a trap. It is not surprising that a corporation tainted with capital dissipation and overpaid taxes should find difficulty in raising wages to match inflation.

When one is caught in a trap, it is customary to carefully examine the interior of the trap, and examination of heavy industry's trap shows that there is only one holding force, the disputed rule of accounting which forbids the recognition of change in dollar purchasing power.

This brings us to the reasons why industry doesn't smash the trap to kindling wood, by settling the disputed rule.

The Reasons for Heavy Industry's Weakness in this Respect

The reasons for weakness concern two things that heavy industry has forgotten:

It has forgotten that an unbridled power is a vicious power.

It has forgotten to transport to finance the thing that made industry great, the Proving Ground.

Heavy industry is paying dearly for these oversights, which, by great good fortune can be remedied. This is a happy form of sorrow, for it can be remedied.

The truth is so obvious that we can quickly agree that, when one party serves as judge, jury and executioner, the quality of justice is not reliable. Over 150 years ago that was recognized in government, by careful segregation into legislative (law-making), judicial, (legality determining and interpreting) and executive (enforcement) functions.

But there is no such provision for handling the rules for converting the wonders of engineering into dollars, and it is not surprising that financial error dissipates the fruits of engineering genius. It was a sad thing for heavy industry that it did not retain at least veto power over the rules of this conversion, even if it didn't retain complete control, as it does in the production of the wonders themselves. As one of the Titans has said, "something is haywire with the rules of the game."

The Proving Ground

Name me a large American corporation in heavy industry without a very respectable Engineering Proving Ground. You can't do it. There is no such thing. Very largely, it is Proving Grounds like Aberdeen, Bell Labs, Du Pont Labs, G.M. Proving Ground and the laboratories of Big Steel that have made this country what it is.

But name me a Financial Proving Ground, and some of its products. There is no such thing. That is why we can't lay our hands on truth in finance. In mundane affairs, where there is no Proving Ground, there is no proof; and where there's no proof, there is no truth. Where there's no truth, nothing works right.

You never heard half the experts in any engineering field stand up and say "yes," on the basis of their opinion, while the other half said "no," on the basis of their opinion, as is done regularly in accounting. And you never saw industry bleed by the 100 million dollars worth for years while they made up their minds. That is because the Engineering Proving Ground is kept so handy. There truth is determined beyond any doubt, on the gallop.

It may be the humor of the gods, made jealous by man's superb achievements in the Engineering Proving Ground, to deny to men of power the realization that the same identical methods of thinking would necessarily produce the same glorious results in finance. It may be a subtle touch that the possessors of the most illustrious Engineering Proving Grounds suffer so grievously for lack of them in finance.

The lack of Financial Proving Grounds is a far cry from one of the Engineer's heroes, Pareto, who told us that no mundane thing can be believed, without perfect liberty to examine and impugn it; and any interference with these processes immediately renders the concept suspicious.

Briefly, the trouble seems to be that there is something radically

wrong with the rules for converting the wonders of engineering into dollars, *and we can't put the matter beyond dispute, simply because there are no Financial Proving Grounds.*

The Nature of Any Proving Ground

A Proving Ground is like an ice-berg; only a little bit of it shows above the surface. The gun emplacements, motor stands and testing machines are only the *apparent, incidental* elements. The *real* elements lie deeper, and represent the fruits of a few great thinkers of the past, to whom the engineer became heir, simply by being willing to receive, appreciate and apply the treasure. Note carefully as we advance, that every one of these fruits, which constitute the engineering method, which in turn culminates in the Engineering Proving Ground, *is either unknown or reversed in finance.* That is important. The treasure is a magic one, for the financial man, as brother to the engineer, could easily share the treasure, without reducing the engineer's portion. Indeed, if the financial man would share the treasure, its total value would be increased many fold, because the engineer's use of it results in wonders which are now dissipated through financial error.

Let us briefly identify the essential real elements of the engineering method, which culminates in the Proving Ground.

The engineer learned from Socrates that any sentence containing a defective identity soon becomes a foolish sentence. Socrates gave us the complete cure for defective identity: unassailable definition. Accordingly, every single term in engineering is carefully defined. There is no doubt about any of them. Furthermore, every definition agrees with every other definition. The joule, the ampere and the kilowatt all agree with the yard, the pound and the second of time. There is no nonsense about it.

Respect for the Idea

Plato cherished the belief that the idea is reality. The trouble was that there were two kinds of ideas—true and false; and Plato died without telling us how to separate them. But the engineer remembered that an idea can be very valuable, if it can be proved true. So in his Proving Ground, an idea is always welcome, even if it seems absurd. It will undoubtedly be tested.

Then the engineer puts the magic of communication behind the tested idea. After proper patent and other protection, the idea is given wide publicity. The idea is never buried because it calls the good old way into question; that's what the engineer calls progress.

Aristotle gave us logic and it forms an essential part of the engineering method.

There is reason to believe that Aristotle's most important contribution to civilization was his work in this field, and the engineer has taken it to heart. In every conceivable spot in engineering, there is a respectable fund of knowledge like this, knowledge beyond dispute.

Skepticism of Technical Authority

Roger Bacon assured us that the chief reason for man's ignorance was man's unreasonable reliance upon authority, and Francis Bacon, Prince of Philosophers, later flatly stated that truth in the field of reason does not come from authority. These concepts seem strange, indeed repugnant, to men in fields so new as to have tradition without having history, but every scientist, every engineer fervently believes them. The two Bacons substituted experiment for authority.

THIS is really the key to the engineer's power. The previously mentioned elements were sound, firm and splendid; but they were barren. After using them for hundreds of years, men still rode in stage coaches. But the introduction of measurement by Newton, Lavoisier and many others really put the scientist's hand on power, and Plato's deficiency in not telling us how to know a true idea from a false one was made good. It is not too much to say that science is largely the process of measuring things. Naturally, the engineer is a past-master of measurement, for he knows that any mundane thing that doesn't agree with measurement cannot possibly be true or useful. The authorities in engineering are simply persons whose views agree superbly with measurement.

And since measurement is simply the process of comparing a thing with a standard, the engineer is very particular about his standards, and requires them to be constant in their essential nature. Measured experiment is the mainstay of the engineering method.

Reversal

Madame de Stael, courtier of Napoleon, put the entire technology of wit and humor in one line: "Sameness in things that are different, and difference in things that are the same." Every joke you ever heard hangs on one or the other. The engineers took this into their method, and some of them did quite well with it, chaps named Westinghouse and Wright, for instance. Westinghouse didn't invent the first method to put brakes *on* by air. Dozens of such methods had failed. His brake was the first to be held *off* by air.

SIMILARLY, when the Wright brothers tried their airplane at Kitty Hawk, they were so disgusted with its performance that one brother declared that it couldn't fly worse backward. Being engineers at heart, if not by degree, they tried it that way, and history records that they actually flew into fame backward, let us hope with a salute to Madame de Stael.

The engineer never forgot this, and every time anything gives trouble, he wonders how it would work backward.

Most of the things you have that are any good were built by these tools, and by remarkably little else: identity, with unassailable definition; logic; respect for the idea; organized knowledge; skepticism of authority; measured experiment; and reversal.

The Engineering Method and Finance

Let us touch lightly on the manner in which these gloriously successful tools are used in finance, or rather, the way they are not used.

Out of a decent respect for Socrates, wisest of men, let's consider identity and definition. Is the thing you must arrange to recover, before income having meaning to a reasonable mind can begin, a number of dollars you invested—dollars which have since changed their only meaning, purchasing power—or is it the purchasing power of those dollars? Is capital the former, or is it the latter? Half the experts claim one, the other half the other, and hardly anybody even pretends to offer proof. However, somebody has gone so far as to offer proof that the universally accepted definition of cost is absurd, on the ground that it is inseparable from measuring without a standard, a thing constant in its essential nature. There has been no attempt at refutation. You never encountered such a disgraceful situation anywhere near a proving ground.

Then, dear old Plato, and his respect for the idea. The new idea, or more often, a different slant on something old, is just about the brightest jewel in the scientist's crown—after it has passed the absurdity, error and sophistry tests at the proving ground. But in finance, what happens to an idea that calls the good old way into question, shouldn't happen to a dog. At the management society, it goes on next year's program, and of course next year never comes. The financial editor is deeply prejudiced against "controversial" subjects, and this is difficult to understand, considering that the subject is controversial only because one side is wrong, or largely wrong. There are some really gallant spirits among financial editors, but they can go only so far. Plato would be very unhappy in heavy industry finance.

Let's not forget Aristotle and his organized, specialized classified knowledge. It cannot be denied that there is such knowledge in finance, but you know and I know that much of it is false, or there wouldn't be the uproar of disagreement at the most important points. Bill Nye fitted a point to Aristotle's lance when he said: "It ain't the things we don't know that makes the trouble; it's the things we know that ain't so."

Aristotle's power seems to have originated in the thousands of talents, which is to say tens of millions of dollars, which Alexander the Great put at his disposal. Modern Alexanders of Industry have been even more prodigally generous to the engineering researcher. Perhaps some day modern Alexanders will lend power to the financial researcher, too.

LET'S be quiet about logic, lest somebody inquire why we have proving grounds in engineering, but none in finance.

The two Bacons, and skepticism of technical authority, which an engineer absorbs almost with his mother's milk, are necessarily difficult to find in finance. Measurement, and the effective means of measurement, which are the basis of engineering, are unknown in finance, which at its present stage of development is limited to counting.

The trouble with counting is that it applies only to similar things, and similar things are very rare in this life. Several hundred years ago, the engineer abandoned counting for measurement, and since then the engineer has been master of difference, while the financial man is the slave of difference.

Since finance must have something to use as a basis, it uses authority as a basis, instead of measurement—and the further we go into inflation, the clearer the inadequacy of the substitution becomes. A skeptic of authority is as out of place in finance, as an opponent of measurement would be in engineering, and for the same reason. But free enterprise is paying dearly for this, for every scientist believes that in the absence of skepticism of authority, truth can exist only by accident, in mundane affairs.

You can see for yourself why we need a Financial Proving Ground to settle the strike problem. The strike problem is entirely a matter of money, and there is plenty wrong with the rules for converting the superb realities of the factory into money. Up to the point of this conversion, everything is smooth-running, satisfactory, successful and under push-button control. That is because the proving ground is in control. The conversion to money is naturally a nightmare simply because the proving ground has not been extended to the conversion.

The conversion is a financial problem in the sense that financial method has failed to control it; but the conversion is an engineering problem in the sense that the standard engineering method, as just described, could take it under control very easily. The problems of the conversion are by nature much simpler than those the engineering method masters very easily, such as steel for jet engines, and radar reflections from the moon.

The Obstacle

The chief obstacle to the provision of a Financial Proving Ground is a peculiar one, for it concerns courage, with which American management is so fully supplied on the engineering end of any business and particularly in heavy industry. But the greater part of courage is the courage of having done a thing before. A titan approves a $10,000,000 appropriation for the engineering proving ground, and his only doubt is whether that is enough. But the Financial Proving Ground is the beggar of life because it has never been done before.

It is respectfully hoped that the Financial Proving Ground, when it comes, will be named for the modern Alexander of industry who first sponsors it, for long after he has been folded unto his fathers, his name will be distinguished above the roar of the furnace, and the growl of the turbine, by a free enterprise that will have become *fit to survive*, by being a match for *all* of its problems, not just the engineering problems.

Summary

1. The root of the strike problem is that the companies are under compulsion to ignore the purchasing power of dollars, whereas the men insist upon recognition of changed dollar purchasing power.

2. The compulsion under which the companies labor is the rules for converting the real accomplishments of the factory into money. Half the authorities claim that the rules are wrong.

3. This leaves heavy industry in a trap, because it lacks truth-finding mechanism in this field.

4. Industry has never lacked truth-finding mechanism on the engineering end of its business, so there are no traps on the engineering end of the business. The Engineering Proving Ground, to be found in every large heavy industry company, insures this.

5. There is no such thing anywhere as a Financial Proving Ground where the successful basic thinking methods of engineering, as described, can be applied to the financial problems which devour us. It may be that the gods, made jealous by man's achievements in the Engineering Proving Ground, deny to men of power the realization that the same identical methods would necessarily produce the same glorious results in finance.

6. An effective Financial Proving Ground can be provided very economically. The gun emplacements, motor stands and testing machines of a Proving Ground are only the apparent elements. The real elements are the basic thinking methods, as described.

7. Among the first experts invited to perform at the Financial Proving Ground should be the best technicians the Treasury Department has and can borrow.

And so, at this critical time, when we are told with complete sincerity that free enterprise cannot survive with labor-management strife, it seems appropriate to close with a line from Aeschylus:

"He who sings to the gods a song of hope may find his prayer granted."

Chemical Research Talk In Washington

General William M. Creasy of the U. S. Army's Chemical Corps was guest speaker at a recent meeting of the District of Columbia SPE. General Creasy, who is the commanding general of the Army Chemical Center at the Edgewood Arsenal in Maryland, spoke on the research and development program of the Chemical Corps.

As a second part of the program, William Eathorne, health and safety engineer for the Bureau of Mines, discussed the *Magic of Fire*.

The meeting was held in the auditorium of the Potomac Electric Power Company Building in Washington.

Kansas News

Topeka P.E.'s recently heard C. R. Van Orman speak on *Flood Control of the Kansas River by the Use of Retention Dams*. Mr. Van Orman, a former Topekan and a licensed P.E., is assistant chief of the Engineering Division of the U. S. Army Corps of Engineers' Kansas City District. The meeting was held at the Jayhawk Hotel.

Another Kansas group, the Eastern Chapter, held a December 3rd dinner meeting at Holiday House in Kansas City.

Advertisers' Index

Adache & Case, Engineers	34
Aerofin Corporation	8
American Photocopy Equip. Co.	5
Auburn & Associates, Inc.	34
B. H. Backlund & Associates, Inc.	33
Bettenburg, Townsend & Stolte	32
George W. Brandt, Engineer	34
Brown & Blauvelt	34
Capitol Engineering Corporation	34
Cloder Corp.	6
Commonwealth Associates, Inc.	32
Consoer, Townsend and Associates	32
Cormit Engineering Company	35
Crescent Engineering Company, Inc.	32
DeLeuw, Cather & Company	32
S. Paul Dooley	32
Fred S. Dubin Associates	32
Thomas E. Duce Associates	35
Eastern Heat Treating & Brazing Corp.	35
Ehrco Die Casting Service	35
Engineers Testing Laboratory, Inc.	35
Eustis Engineering Company	32
Fay, Spofford & Thorndike	32
Forrest and Cotton	35
Frazier-Simplex, Inc.	34
Gannet, Fleming, Corddry & Carpenter, Inc.	34
Geo-Optic Co., Inc.	3
Gustave M. Goldsmith	34
Greer & McClelland	33
Frank E. Harley & Associates	33
C. M. Hathaway	32
Clifford W. Hill	33
The Hinchman Corporation	32
Allan T. Holloway & Associates	33
James H. Howard and Associates	35
Howard, Needles, Tammen & Bergendoff	34
G. A. James & Associate Engineers Inc.	32
Kaiser Engineers	32
Kennedy-Riegger Drilling Co., Inc.	8
Knappen-Tippetts-Abbett-McCarthy	34
Robert C. Lafferty	35
Ellis M. Landis	34
Law-Barrow-Agee-Laboratories, Inc.	32
Lawrie & Green & Associates	34
Loedding Engineering Co., Inc.	35
Madigan-Hyland	34
Emmet J. McDonald	34
Modjeski and Masters	35
James P. O'Donnell	34
Oklahoma Testing Laboratories	34
Parsons, Brinckerhoff, Hall & Macdonald	34
Potteiger Company, Inc.	35
Process Designs, Inc.	33
Revolvator Company	3
Cyrus Wm. Rice & Co., Inc.	35
Robert and Company Associates	32
F. A. Sando	32
W. W. Slocum & Co.	33
South Florida Test Service	32
D. B. Steinman	34
Syska & Hennessey, Inc.	34
Thomas Gas Contractors, Inc.	8
John L. Thompson & Company	32
Toledo Testing Laboratory	34
United States Testing Company, Inc.	33
Emerson Venable	35
Warner Engineering Co.	34
Warren-Knight Co.	7
Edward J. White Company	8
Harold H. White	33
Whitman, Requardt and Associates	32
E. J. Will & Company	8
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Yokley & Waggoner	35

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PROFESSIONAL ENGINEERS CONFERENCE BOARD FOR INDUSTRY

BY PAUL H. ROBBINS, P.E.

Executive Director

N.S.P.E.

In some of these previous discussions, reference has been made to the work of the Professional Engineers Conference Board for Industry. This month, the Board will release its Third Executive Research Survey Report—a report which has been the result of an extensive survey of some 200 industrial firms and several thousand engineers, as well as of interviews with and reports from a number of industrial executives. This Third Report, on the subject, "How to Attract and Hold Engineering Talent," provides an insight into a number of factors which motivate engineers as professional men employed in our industrial operations. It has particular significance because of the extensive discussions of the past few months on matters of collective bargaining for professional employees, economic status of engineers, the high demand for technical personnel, and the general economic and industrial status of our nation.

The Professional Engineers Conference Board for Industry, it will be recalled, was established in 1951 for the purpose of coordinating and directing research into a number of perplexing problems concerning engineers employed in industry. Consultation with some 200 industrial executives who rely heavily on engineering personnel pointed up a series of problems on which they felt studies and correlation of existing practices would be helpful. The previously-published reports — the first on Engineering-Management Communications, and the second on Improved Utilization of Engineering Manpower — were directed specifically at two of these major problems.

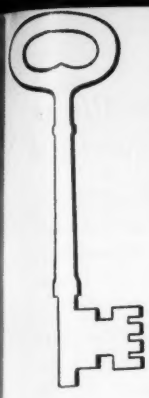
It was apparent early last year that insufficient information was available on some of the factors which motivate engineers as professional men. The Conference Board thus turned its research efforts to this problem, and questionnaires were addressed to leading industrial firms inquiring as to practices they had found beneficial in the employment and retention of engineering personnel.

Realizing the desirability of finding out from the individual engineers themselves their reactions to these policies, a questionnaire similar to that sent to the firms was sent to several thousand professional engineers and engineers-in-training employed in industry. From these results have come the series of interesting observations which are contained in the Third Report. These observations will not only serve industry in focusing attention on several problems bothering engineering employees, but also will present an insight into employment conditions toward which programs of the National Society of Professional Engineers can be directed.

The Committee on Engineers in Industry, which recently met in Washington for the purpose of mobilizing NSPE activities for this important segment of our profession, took cognizance of a number of these findings and its report to the Spring Board Meeting will emphasize the challenge to the professional society to be of greater service to these members.

The Professional Engineers Conference Board for Industry was recently incorporated as a separate organization for the purposes of continuing research into these important problems, publishing and distributing information thus gleaned, conducting clinics and conferences by which the experience of industrial organizations may be exchanged, and, in general, disseminating information so that the engineering profession may be of greater service to industry and, in turn, enhance its professional status.

Considerable interest has been evinced by industry and foundations in the results of this research, and, while the work has been carried on to date through funds contributed by NSPE members for the support of the Conference Board, it is hoped that in the future the importance of this research activity will warrant its support through funds supplied from foundations and industrial concerns. —*End.*



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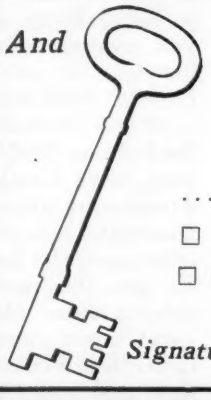

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With Our Members . . .

North Dakota Highlights

Governor Addresses Annual Banquet; W. A. Anderson Elected President for '54

The North Dakota Society of Professional Engineers held its 1953 annual meeting in Bismarck, N. D., recently. Featuring both business and social sessions, the two-day event attracted engineers from throughout the State.

Governor Norman Brunsdale extended his personal greetings to the Society when he spoke at the annual banquet. The main address at the banquet was given by P. Larson, director of public relations for the Standard Oil Company's refinery project at Mandan, N. D.

During the business sessions the members in attendance heard reports from various State officers on NSPE national meetings which they had attended as well as an address by E. W. Seeger of Milwaukee, NSPE Central Area vice president. A symposium on public relations, membership, and Engineers' Week was also presented; and several professional engineers and contractors took part in a panel discussion of topics of concern to both groups.

Business was concluded with the election of new officers for 1954. They are as follows: *president*—Professor A. W. Anderson, School of Engineering, Fargo, N. D.; *vice president*—L. W. Viegel, consulting engineer, Dickinson; *secretary* — Joseph R. Kirby, assistant bridge engineer, Bismarck; and *national director*—R. H. Myhra of Minot.

ASME Honoree

William F. Ryan, above, a past vice president of NSPE, has been accorded honorary membership in The American Society of Mechanical Engineers in recognition of his pioneer work in electric generating projects and his efforts in promoting engineering education. Mr. Ryan is now vice president and engineering manager of the Stone & Webster Engineering Corp., Boston.

Western Wisconsin Group Hosts Joint Meeting

Members of the Western Chapter, Wisconsin SPE, recently entertained members of the Southeast Chapter, Minnesota SPE, and of the La Crosse group of the American Society of Mechanical Engineers at a meeting at the Cerise Club in La Crosse.

During the meeting the resolution supporting registration and membership in NSPE, recently passed by the Minnesota Section of ASME, was read by Arnold Medberry, chairman of the La Crosse AMSE group.

A program on *Aircraft Jet Engines* was presented by J. W. Magee, Jr., steam apparatus application engineer with the Westinghouse Corporation.

Pennsylvania News

Members of the Johnstown Chapter, Pennsylvania SPE, held their annual Ladies' Night and Christmas Party on Saturday, December 5th. The annual meeting of the Midwestern Chapter was held December 5th in New Castle.

Dr. Merritt Wiliamson, director of research for the Burroughs Co., of Paoli, addressed members of the Chester County Chapter on the subject of *What Are the Fundamentals in the Education of an Engineer?* at a recently reported meeting. Dr. R. C. Johnson, vice president in charge of research for the Anthracite Institute in Wilkes-Barre, spoke before a recent meeting of the Lehigh Valley Chapter. His subject was *Non-Fuel Uses of Anthracite.*

At the December 9th meeting of the Reading Chapter, those in attendance heard Charles F. Knapp, construction superintendent for Gilbert Associates, talk on *An American Engineer and His Know-How—in Italy.* He also illustrated his lecture with colored slides. Members of the Lincoln Chapter, meeting recently in Lancaster, heard talks on the medical and legal professions, given by Dr. James V. Appel and Attorney Louis S. May.

Wisconsin SPE Plans Eleventh Annual Meeting

The Eleventh Annual Meeting of the Wisconsin Society of Professional Engineers will be held in Milwaukee, January 28-30, according to President Pierce G. Ellis.

Dr. J. O. Christianson, of the University of Minnesota's School of Agriculture, will be the speaker at the Friday evening banquet. He will deal with the subject of *Americanism.* Arrangements have also been made for several outstanding personalities to lecture on topics of concern to engineers during the course of the meeting, and an interesting program is being scheduled for the Functional Group meetings.

Orrin E. Andrus of Milwaukee is chairman of the Program Committee.

Ohio News Items

The annual Christmas Dance and Card Party sponsored by the Cleveland professional engineers was held at the Lake Shore Hotel on Friday, December 4. The Mahoning Valley Chapter also sponsored a dinner-dance on December 11 at the Tippecanoe Country Club.

A recent meeting of the Franklin County Chapter featured the presentation of certificates to new registrants in the Columbus area, plus an address by Gordon B. Carson, dean of the College of Engineering, Ohio State University.

E. Crankshaw, chief engineer for Cleveland Graphite Bronze, spoke on *Sleeve Bearings* at the December 9th dinner meeting of the Lorain County Chapter, which was held in the Hotel Antlers in Lorain.

New York Lectures

The Transistor, the "Mighty Midget," was the subject of an address made by Leslie R. Blasius before a recent meeting of the New York Chapter of the NYSSPE. Mr. Blasius is with the New York Telephone Company.

State Building Code Commissioner Ralph A. Lehr was guest speaker at a recent dinner meeting of the Niagara County Chapter, which was held at the La Salle Yacht Club. His address covered the building code improvement program now being undertaken by the State of New York, and he answered questions from the floor concerning legal aspects of the situation and procedures required for adoption, administration, and enforcement of the code.

PHOTO ROUNDUP—Swinging the camera around the nation, NSPE finds many interesting scenes. Photos in the top row depict: (1) Certificate presentation under auspices of Northeast Pa. Chapter. L. to r.—Chapter Secy. E. R. Evans, W. G. Gibbard, E. Paul, T. B. Dilley, Registration Board Member W. H. Lesser, J. C. Engle, Jr., H. Landsman, G. H. Kocyan, A. E. Franke, and Chapter President W. H. Lewis. (2) President H. K. Rigsbee and First Vice President N. E. Latson of the Travis Chapter, Texas SPE. (3) Tennessee President A. W. Stone presenting a student chapter charter to Charles Meadows of Tennessee Polytechnic Institute, Cookeville.

Second row photos show: (1) Scene during a meeting hosted by charter members of the San Diego, Cal., Chapter for 200 registered P. E.'s. L. to r.—C. F. McCabe, Convair chief electronics engineer; San Diego Mayor J. D. Butler; Bernard Gross, lab director, Rohr Aircraft; L. M. Klauber, chairman, San Diego Gas & Electric Co., and Chapter President E. A. Balas. (2) Presentation of a certificate of service to Joseph D. Rufo (right), President, Los Angeles Chapter, CSPE, by NSPE President T. Carr Forrest, Jr. (3) Leading participants in the Philadelphia Chapter's December meeting. L. to r.—Wm. K. Griesinger, research and development director, Atlantic Refining Co., the main speaker; Chapter President R. W. Hoch; Past President and State Dir. Wm. A. Toperzer; and A. E. Baccini, Meetings Committee chairman.

Traffic Engineering Is Lecture Topic

The December dinner meeting of the Delaware Society of Professional Engineers featured a lecture by Wilbur S. Smith on *The Role of Traffic Engineering in Highway Safety*. Mr. Smith is associate director of the Bureau of Traffic Research, Yale University, and also heads a highway consulting concern.

The meeting was held at Hanna's Restaurant in Wilmington. E. Powell Smith is president of the Delaware SPE, which sponsored the event.

California Notes

NSPE President T. Carr Forrest, Jr., was guest speaker at a recently-reported joint meeting of the Los Angeles, Pasadena, and San Diego Chapters. His topic was *The Taft-Hartley Law and the Professional Engineer.*

Members of the East Bay Chapter recently heard Engineer Maurice M. Ridker discuss *Parking Problems and Their Improvement* from an engineering viewpoint.

Bert Stewart, Jr., field secretary of the National Automobile Club, addressed the December 8th dinner meeting of the San Jose Chapter on the topic, *Personal Public Relations Pays Off.*

P.E. PUBLICITY CHAIRMEN

YOU have a date for FEBRUARY 28th!

That's the time to send your Engineers' Week story to the *American Engineer.*

As usual, space will be limited but we will give as wide coverage as possible. So get the news of the week's outstanding events in the mail EARLY.

FEBRUARY 28th is the day to do it!

Milwaukee P. E.'s Hear Current Events Discussion

E. J. Kallevang and A. E. Behling, Wisconsin SPE national directors, were the guest speakers at the December 8th meeting of the Milwaukee Chapter. They discussed *Current Events Affecting the Professional Status of Engineers.*

Mr. Behling is a Milwaukee consulting engineer, and Mr. Kallevang is chief engineer of the Wisconsin Power & Light Co. in Madison.

Conservation Lecture In Tulsa

Col. Stanley G. Reiff, district engineer for the Corps of Engineers in the Tulsa District, was the guest speaker at the December meeting of the Tulsa Chapter, Oklahoma SPE. His subject was *The Conservation of Our Natural Resources as an Engineering Problem.* The meeting also featured a "Civil Engineers' Night" program.

. . . more news on page 33

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With the Ladies

By MRS. FRANK W. CHAPPELL

Chairman, NSPE Ladies Advisory Committee

Of interest to all members of the ladies' auxiliaries is the following resolution that was adopted by the NSPE board of directors at the Fall Meeting in Indianapolis:

Moved by Vice President Shoch, Seconded by Vice President Thomas, that the Executive Committee recommend to the Board that, recognizing the proved and potential value of the Ladies Auxiliary groups to Chapters of the Professional Society, their activities be encouraged and coordinated by charging the National Society Chapter Activities Committee with the additional responsibility of such coordination and promotion among Ladies Auxiliaries wherever deemed necessary or desirable by the local units. Carried.

Members of the Ladies' Auxiliary to the Nueces Chapter, Texas SPE, have planned a round of entertainment for women visitors to Corpus Christi for the TSPE annual meeting, January 28-30. Among the events scheduled are a luncheon at the Town Club on January 28, a morning coffee on January 29, and a luncheon and style show at the Corpus Christi Country Club.

Mrs. T. O. Foster, Jr., auxiliary president, will act as hostess, while Mrs. Hugh Wilbanks is serving as general chairman.

The Pittsburgh Chapter Ladies' Auxiliary now counts its membership at 150 and has just published its first yearbook. Mrs. Glenn M. Comstock is the auxiliary's president.

N. Shore Mass. Chapter Has New President

L. W. Burton has been appointed by the board of directors of the North Shore Chapter, Massachusetts SPE, to complete the unexpired term of 1953-54 President Charles B. Fontaine. The change was necessitated by Mr. Fontaine's transfer to Schenectady, N. Y. Mr. Burton, the new president, was formerly vice president of the chapter.

The program for the chapter's December meeting featured a lecture by E. W. Boehne, professor of electrical engineering at M.I.T. For the January meeting, a talk by K. F. Knowlton, superintendent of the Salem-Beverly Filtration Plant, has been scheduled.

Westchester County Silver Jubilee

Members of the Westchester County Chapter of the New York State SPE recently celebrated the silver jubilee of their organization with a dinner at the Glen Island Casino in New Rochelle. The event was attended by 492 members and guests who were welcomed by President Richard M. McLaughlin.

Committee chairmen who planned the celebration included: Max Vogel—dinner arrangements; Vincent G. Terenzio—entertainment; Joseph A. Brady—reception; and Robert Cummings—tickets and finance.

Ill. Registration Law Is Lecture Topic

L. K. Crawford recently addressed the members of the Central Illinois Chapter, ISPE, on the subject of *Weakness of the Illinois Professional Registration Law and Difficulties of Getting Enforcement.* Mr. Crawford is a partner in Crawford, Murphy, and Tilly, consulting engineers of Springfield.

. . . more news on page 35

Professional Directory

Alphabetically Arranged by States . . . *. . . New York - Pennsylvania*

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Professional Directory

Alphabetically Arranged by States . . . Pennsylvania - W. Va.

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Consulting, Design and Detail
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Queens Chapter Hears Gerald T. McCarthy

Members of the Queens Chapter, NYSSPE, recently heard an address by Gerald T. McCarthy on *The Engineer and the Foreign Aid Program.* Mr. McCarthy, who is a partner in the firm of Knappen-Tippetts-Abbett-McCarthy, Engineers, reviewed the history of the Technical Assistance Program from 1938 to the present, emphasizing the role and the responsibility of the engineer in this regard.

Calumet Chapter P.E.'s Report Interesting Talks

Members of the Calumet Chapter, Indiana SPE, met recently in the Marshall House, Gary, Ind., to hear State President John Swanton speak on professional activities for the coming year.

Postscripts

(*Continued from page* 21)

closed the fact that the shortage amounted to approximately 3,500 highway engineers. Another survey made by the same group indicated that civil engineering graduates this year and the next would fall short of the demand by 13,000. This shortage has caused a steady increase in the pay scales of engineers in private employment and a further shortage in public employment.

Citing an example of low pay, a survey of salaries for state highway engineers shows that on last March 1st the salary of the chief engineer for the state of Nebraska was $7,440 annually. Compare this figure with the incomes admitted by some of the local labor leaders in Kansas City who think nothing of dragging down about $250 weekly and riding around in Cadillacs. This for rendering such services to the public, in many cases, as fist swinging, fee collectors. The civil engineer is a professional man and should receive compensation as such, but too often in this world of ours we overpay those of mediocre ability and offer a pittance to those who are really qualified.

The engineer, like everyone else, not to mention editors, has many problems in life: food and clothing to buy, a place to live, a desire to live decently. Many of our local and national government officials realize the plight of the engineer and deplore its effect but public policies are slow to change.

The word "civil" often prefaces the word "engineer." It is high time that we, the public, were a little more civil to our highway engineers.

American Engineer Index for 1953

A

ADMINISTRATION
What about the Engineer as an Administrator? by Harlan Hatcher; Prof. Post. ... June 28
AIDLIN, S. S.
Engineer as an Expert Witness, The ... Nov 18
AIR CONDITIONING
Twentieth Century Magic ... Aug 17
Aircraft Engineering Moves with Seven League Boots ... July 13
American Engineer Index for 1952 ... July 37
America's Roots; by Gilbert E. Doan ... May 24
Are You Ready for Seven (b) Day?; by Thomas E. Murray ... Apr 11
Arms Standardization Need Re-Emphasized ... Jan 22
Army Acts on Engineer Utilization; by Edward J. Sloane ... Aug 19
ART
Canvases Show Talent and Imagination ... July 10
Christmas Cover Note ... Dec 8
Exhibitions Welcome Engineers' Paintings ... Aug 15
Introducing Remig A. Papp, Pen-and-Ink Specialist ... June 14
Associated General Contractors' Recommendations Reported; Prof. News ... May 6
ATOMIC ENERGY
Are You Ready for Seven (b) Day?; by Thomas E. Murray ... Apr 11
Atomic Forum Is Established ... June 24
From Washington; by Milton F. Lunch ... Apr 23, July 11
Professional Engineer at Yucca Flats, A; by L. L. Dresser ... May 8
Automobile, The—Tribute to American Engineering ... Oct 14
AWARDS
Chance, F. Gano; Hart, Roy P.; Powell, Frederick K., Jr.; Stokes, Stanley; Prof. News ... May 7
Edgerton, Dr. H. E.; Prof. News ... Feb 6
Egloff, Dr. Gustav; Prof. News ... Apr 6
Fairless, Benjamin F.; Prof. News ... Aug 7
Fairman, James F. ... Jan 23
Fairman, James F.; Prof. News ... Aug 6
Flanders, Sen. Ralph E.; Prof. News ... Nov 6
Kinnard, I. F.; Prof. News ... May 6
Piasecki, Frank N., Wins Jaycee Award ... Mar 18
Lichtenberg, Col. C.; Prof. News ... Sept 6
Potter, A. A.; Prof. News ... Aug 6
Praeger, Emil H.; Prof. News ... July 6

B

BARUCH, BERNARD
Needed: A Sure Sense of Values ... Sept 9
Basic Economics of Engineering-Management Relations; by Knox A. Powell ... Feb 33
Batt, William L. and Arms Standardization ... Jan 22
Bausch & Lomb's 100 Years ... Nov 15
BECHER, HAROLD
Human First, Engineer Second; Prof. Post. ... Apr 29
Benline, Arthur J., Heads Building Officials; Prof. News ... July 6
Beretta, J. W., Named Stevens Aide; Prof. News ... Oct 6
BILLMYER, CARROLL D.
Engineering Education; Prof. Post. ... Oct 28
BREWER, GENE
Engineering as a Profession; Prof. Post. ... July 28
BURDELL, DR. EDWIN S.
We Must Keep our Teachers ... June 22
BUREAU OF STANDARDS
Colorado Lab.; Prof. News ... Jan 8
Engineering's Important at the Bureau ... May 21
From Washington; by Milton F. Lunch ... May 11
BUSH, VANNEVAR
Relation of Fundamental Research to Engineering, The ... May 13
Business Leadership—A Positive Responsibility; by Leland I. Doan ... Dec 9
BUTLER, SOULE
South Brings Its Building Codes Up to Date, The ... Mar 26

C

Carrier Corporation ... Aug 17
Case for Technology, The; by Brig. Gen. David Sarnoff ... Oct 9
CIVIL DEFENSE
Professional News ... Feb 6, June 6
College costs are climbing; Prof. News ... Oct 7
Coming True—An Engineer's Dream; by Sen. Spessard L. Holland ... June 9
Commerce Department Plans Business Services Network; Prof. News ... Aug 6
Committee Function, The; by Paul H. Robbins ... Aug 28
COMMITTEES
President Forrest Names 1953-54 Committees ... Aug 29
Conference on Resources for the Future Planned; Prof. News ... June 6
CONSTRUCTION
South Brings Its Building Codes Up to Date, The; by Soule' Butler ... Mar 26
COURT RULINGS
Engineers' Opinion Upheld in Ohio Turnpike Case ... July 26
N. J. Court Rules Against Engineer ... May 30
Oregon Supreme Court Holds Surveyor Need Not Be Registered ... Sept 23
Professional Status of Surveyors at Stake in Ohio Court Case ... Nov 8
CREPEA, WILLIAM
Engineers' Salaries; Prof. Post. ... Mar 27

D

DEFENSE MOBILIZATION
From Washington; by Milton F. Lunch ... May 11, Aug 13, Sept 28
DERRY, STEPHEN ARTHUR
Why Engineer Registration?; Prof. Post. ... Aug 26
Design Factors in Engineering Unity; by Clarence T. Shoch ... Sept 13
DOAN, GILBERT E.
America's Roots ... May 24
DOAN, LELAND I.
Business Leadership—A Positive Responsibility ... Dec 9
DRESSER, L. L.
Professional Engineer at Yucca Flats, A ... May 8
DSF Administrator Cites Engineers' Responsibility in Defense; Prof. News ... June 6
DUCKER, W. L.
Cross-Roads of Engineering Education, The; Prof. Post. ... Dec 33
DUES INCREASE
Brings New, Aggressive Programs by T. Carr Forrest, Jr. ... Nov 22
Special Committee Cites Rise of Unionism as Need for Dues Increase ... Apr 20

E

ECONOMICS
Basic Economics of Engineering-Management Relations; by Knox A. Powell ... Feb 33
EDUCATION
Billmyer, Carroll D.; Prof. Post. ... Oct 28
Canada; Prof. News ... Jan 8
City College of New York Inaugurates New Program; Prof. News ... July 7
Cross-Roads of Engineering Education, The, by W. L. Ducker; Prof. Post. ... Dec 33
Engineering as a Profession; by Gene Brewer; Prof. Post. ... July 28
Grads Are Assured of Jobs; Prof. News ... Mar 38
Graduate Education and the Profession; by Dr. R. L. Sweigert ... Apr 21
Industry-Education Teamwork ... Mar 25

Page

NSPE Urges Tax Cuts for Professional Education ..... Aug 8
Professional Development Program Is Under Way in Cincinnati; Prof. News ..... Dec 6
Professional News ..... Mar 6
"Program for Executives"; Prof. News ..... Dec 49
Role of the State University in Progress and Development, The; by Dr. Lewis Webster Jones ..... Jan 16
Special Report ..... Apr 9
Support of Engineering Education; by E. W. Seeger ..... May 27
Tulane Establishes Engineering Research Institute; Prof. News ..... Dec 6
We Must Keep our Teachers; by Dr. Edwin S. Burdell ... June 22
What Do We Really Mean by Education; by Robert H. Nau ..... Sept 20
Egloff, Dr. Gustav ..... May 26

ELECTRONICS
Case for Technology, The; by Brig. Gen. David Sarnoff .. Oct 9

EMPLOYMENT
American Univ. Survey ..... Apr 27
Employment Outlook for Technicians; Spec. Report ..... Aug 23
Mr. Engineer—Sell Yourself!; by Arthur R. Pell ..... Aug 22
Special Report ..... Apr 9
Engineer as an Expert Witness, The; by S. S. Aidlin ..... Dec 18
Engineer in Public Life, The; by Mayor Raymond R. Tucker ..... Dec 9
Engineer, The . . . Homefront Specialist; by Mrs. Frances T. Kirkwood ..... Jan 20

ENGINEERING & ARCHITECTURAL PRACTICES
Ohio Engineers and Architects Work Together; by A. C. Neff ..... June 26
Professional News ..... Feb 6
Tennessee's Fonde Case Is Decided in Favor of Engineers' Position ..... Feb 5
Engineering Around the World ..... Feb 24

ENGINEERING AS A CAREER
Reference Material; Special Report ..... June 8
Engineering Fish Story, An; by David A. Heller ..... Apr 17
Engineering Profession Needs Public Relations, The; by Floyd A. Lewis ..... Sept 24
Engineering's Important at the Bureau ..... May 21
Engineers and Monkeys; Prof. Post. ..... June 29
Engineers Can Stop America's Greatest Waste; by Arthur Sanders ..... May 18
Engineers in the Headlines ..... Oct 26

ENGINEERS JOINT COUNCIL
NSPE Discusses Affiliation ..... Dec 44
Estonian Receives Degree in 2½ Years ..... Sept 18

ETHICAL PRACTICES
Five Points; by Elmer N. Iberg; Prof. Post. ..... Apr 30
NYSSPE Hits Law Allowing Corporations to Practice Engineering; Prof. News ..... Mar 7
Purington, Don; Prof. Post. ..... Oct 27

EXPLORATION
There's Engineering in Exploration; by Gilbert Grosvenor ..... Jan 11

F

FAIRLESS, BENJAMIN F.
We Cannot Survive with Labor-Management Strife ..... Mar 11

FISH
An Engineering Fish Story; by David A. Heller ..... Apr 17

FORREST, T. CARR, JR.
Dues Increase Brings New, Aggressive Programs ..... Nov 22
Think and Act as Professional People ..... July 8
Future Bright for Engineers—H. Hoover ..... Sept 8

G

GAHANKA, PETER
Everything Begins with an Idea; Prof. Post. ..... Feb 33

GILT, CARL M.
Engineers' Week; Prof. Post. ..... Mar 28

GOVERNMENT
Engineering Standards Criticized; Prof. News ..... Jan 8
Our Function in Governmental Liaison; by Paul H. Robbins ..... July 29
We Cannot Survive with Labor-Management Strife; by Benjamin F. Fairless ..... Mar 11
Graduate Education and the Profession; by Dr. R. L. Sweigert ..... Apr 21

GROSVENOR, GILBERT
There's Engineering in Exploration! ..... Jan 11

Page

H

HARTY, EDGAR A.
Prof. Post. ..... Nov 29

HATCHER, HARLAN
What about the Engineer as an Administrator?; Prof. Post. ..... June 28
Headquarters Housing, Enlarged 1954 Program, Leading Items on Executive Committee Agenda at D. C. Meeting ..... Sept 12

HELLER, DAVID A.
An Engineering Fish Story ..... Apr 17
Human Factor in Engineering Work, The ..... Feb 30

HERNANDEZ, ALBERTO
Puerto Rico, 20th Century Industrial Frontier ..... Dec 13

HIGHWAYS
Coming True—An Engineer's Dream; by Sen. Spessard L. Holland ..... June 9
Professional News ..... Jan 9
Oct 6
Romans Knew Their Roads, The ..... Mar 15

HOLLAND, SEN. SPESSARD L.
Coming True—An Engineer's Dream ..... June 9

HOOVER, HERBERT
Message from ..... Sept 8
How to Improve the Utilization of Engineering Manpower ..... Feb 11
Mar. 19
Human Factor in Engineering Work, The; by David A. Heller ..... Feb 30
Human First, Engineer Second; by Harold Becher; Prof. Post. ..... Apr 29

I

IBERG, ELMER N.
Prof. Post. ..... Apr 30
Oct 29

INDEX
1952 ..... July 37
Industrial Research and Development; Special Report .... May 17

INDUSTRY
AGC Says Construction Industry to Set New High in 1953 ..... Oct 16
Aircraft Engineering Moves with Seven League Boots ..... July 13
Bausch & Lomb's 100 Years ..... Nov 15
Business Leadership—A Positive Responsibility; by Leland I. Doan ..... Dec 9
Case for Technology, The; by Brig. Gen. David Sarnoff .. Oct 9
Industry-Education Teamwork ..... Mar 25
Kuljian, Harry A.; Engineer and Cosmopolite ..... June 17
Now Santa Is An Engineer! ..... Dec 22
Professional Engineer in Industry; by Paul H. Robbins ..... Dec 35
Puerto Rico, 20th Century Industrial Frontier; by Alberto Hernandez ..... Dec 13
Twentieth Century Magic ..... Aug 17
We Cannot Survive with Labor-Management Strife; by Benjamin F. Fairless ..... Mar 11

J

JENKS, ERNEST E.
What Kind of an Executive Does an Engineer Make? .... Oct 23

JONES, DR. LEWIS WEBSTER
Role of the State University in Progress and Development, The ..... Jan 16

K

KIRKWOOD, FRANCES T.
Engineer, The . . . Homefront Specialist ..... Jan 20

KNEILING, JOHN G.
On labor unions; Prof. Post. ..... May 31
Kuljian, Harry A.: Engineer and Cosmopolite ..... June 17

L

Labor Legislation Testimony Presented; by Clarence T. Shoch ..... May 42

LABOR-MANAGEMENT
Prof. Post. ..... May 32
We Cannot Survive with Labor-Management Strife; by Benjamin F. Fairless ..... Mar 11

LEGISLATION, STATE
Minn. Conducts Successful Legislative Program ..... Aug 8

Page

LEONARD, HENRY K.
Patent Fundamentals for Engineers ..... Oct 17
Nov 25
Dec 30

LEWIS, FLOYD A.
Engineering Profession Needs Public Relations, The ..... Sept 24

M

MAMARCHEV, JAMES D.
Public and the Engineer, The ..... July 27
Manpower Council Makes Recommendations ..... June 27

McKAY, DOUGLAS
Public Power—A Policy for the United States ..... Aug 9
M.D.s', Dentists', Lawyers', Engrs.', Incomes Cited ..... Nov 32

MEETINGS
Annual Meeting Program ..... June 30
Headquarters Housing, Enlarged 1954 Program, Leading Items on Executive Committee Agenda at D. C. Meeting ..... Sept 12
Important Decisions Made in Daytona ..... July 24
Indianapolis to be Scene of Professional Assembly; Governor Craig to Speak ..... Oct 25
June NSPE Annual Meeting ..... May 28
NSPE Executive Committee Meets in Washington ..... Feb 7
NSPE's Board of Directors ..... Dec 19
State Presidents Meet in Louisville ..... Apr 26
Minn. Conducts Successful Legislative Program ..... Aug 8
Mister Petroleum ..... May 26

MOBILIZATION
From Washington; by Milton F. Lunch ..... Feb 9
Mr. Engineer—Sell Yourself!; by Arthur R. Pell ..... Aug 22

MURRAY, R. L.
Development of Young Men for Positions of Greater Responsibility, The; Prof. Post. ..... Nov 29

MURRAY, THOMAS E.
Are You Ready for Seven (b) Day? ..... Apr 11

N

NATIONAL DEFENSE
From Washington; by Milton F. Lunch ..... Feb 9
Professional News ..... Jan 9

NATIONAL ENGINEERS' WEEK
Engineering Around the World ..... Feb 24
1953 Engineers' Week Roundup ..... Apr 32
Prof. Post.; by Carl M. Gilt ..... Mar 28
Time to Gild the Lily ..... Jan 18

NATIONAL MANPOWER COUNCIL
Special Report ..... July 19

NATIONAL SCIENCE FOUNDATION
From Washington; by Milton F. Lunch ..... Mar 9
Professional News ..... Mar 6
Jan 9

NSPE BELIEVES; by Paul H. Robbins
Committee Function, The ..... Aug 28
Do We Have Enough Engineers? ..... Nov 34
Function of the Board, The ..... Sept 30
Is Our Registration Requirement Limiting Membership? May 34
Our Function in Governmental Liaison ..... July 29
Our Public Relations Responsibilities ..... June 32
Professional Engineer in Industry, The ..... Dec 35
Professional Stature—Not Via Collective Bargaining ..... Oct 32
Unity for Professional Action ..... Apr 8
Why a Professional Society? ..... Mar 8
NSPE Board Members Decline Affiliation with EJC, 69-12; Approve New Hqs. Building ..... Dec 19
NSPE Officers for 1953-54 ..... July 9
NSPE Urges P. E. Exemption from Wage-Salary Curbs Robbins Tells Senate Committee; Prof. News ..... Apr 7
NSPE Urges Tax Cuts for Professional Education ..... Aug 8

NATURAL RESOURCES
From Washington; by Milton F. Lunch ..... Sept 27

NAU, ROBERT H.
What Do We Really Mean by Education? ..... Sept 20
Needed: A Sure Sense of Values; by Bernard Baruch ..... Sept 9
Need for Improved Industrial Productivity Cited; Prof. News ..... Nov 6

NEFF, A. C.
Ohio Engineers and Architects Work Together ..... June 26

NELSON, H. B.
Poem; Prof. Post. ..... June 30
New Orleans Expressway Planned; Professional News ..... Jan 8
N. Y. Bill Calling for Corporate Practice of Engineering Is Withdrawn ..... May 30
Now Santa Is An Engineer! ..... Dec 22

Page

O

OFFICERS
Board of Directors—1953-54 ..... Sept. 31
Committee Nominates 1954-55 Slate ..... Dec 27
O God, Look Kindly Upon this Group ..... Dec 8
Ohio Engineers and Architects Work Together; by A. C. Neff ..... June 26
Oregon Supreme Court Holds Surveyor Need Not Be Registered ..... Sept 23

P

Palmer, Stanley G., Installed as N.C.S.B.E.E. Prexy at San Antonio ..... Dec 12
Patent Fundamentals for Engineers; by Henry K. Leonard ..... Oct 17
Nov 25
Dec 30
P. E. Conference Board for Industry Reviews Questionnaires for Third Executive Survey ..... Aug 16

PELL, ARTHUR R.
Mr. Engineer—Sell Yourself! ..... Aug 22

PERALTA, B. C.
Why I Want to be a Professional Engineer; Prof. Post. ..... Aug 25

PHILLIPS, H. W.
Professional Freedom to Contract; Prof. Post. ..... July 28
Government Engineering Standards Criticized; Prof. News ..... Jan 8

POEMS
Christmas Magic; by D. B. Steinman ..... Dec 34
Coveted Title of "Engineer," The; by H. B. Nelson; Prof. Post. ..... June 30
Dream, A Song, A Prayer, A; by D. B. Steinman ..... May 27
I Built a Bridge; by D. B. Steinman ..... May 27
Suspension Bridge; by D. B. Steinman ..... Feb 33

POWELL, KNOX A.
Basic Economics of Engineering-Management Relations; Prof. Post. ..... Feb 33
President Forrest Names 1953-54 Committees ..... Aug 29
Professional Engineer, The—Ascending to New Heights or Leveling Off to Mediocrity?; by W. R. Woolrich ..... April 24
Professional Engineer at Yucca Flats, A; by L. L. Dresser ..... May 8

PROFESSIONALISM
Why a Professional Society?; by Paul H. Robbins ..... Mar 8
Professional Status of Surveyors at Stake in Ohio Court Case ..... Nov 8

PSYCHIATRY
Human Factor in Engineering Work, The; by David A. Heller ..... Feb 30
Public and the Engineer, The; by James D. Mamarchev ..... July 27
Public Power—A Policy for the United States; by Douglas McKay ..... Aug 9

PUBLIC RELATIONS
Engineering Profession Needs Public Relations, The ..... Sept 24
Our Public Relations Responsibilities; by Paul H. Robbins ..... June 32
Prof. Post ..... Mar 28
May 31
Puerto Rico, 20th Century Industrial Frontier; by Alberto Hernandez ..... Dec 13
Puerto Rico's New Rum Plant ..... Sept 16

PURINGTON, DON
About Professional Ethics; Prof. Post. ..... Oct 27

R

Reference Material on Engineering as a Career; Special Report ..... June 8

REGISTRATION
Alabama P. E.'s Resist Change in 'Eminence' Registration Provision ..... Aug 30
Court Ruling ..... Apr 27
Is Our Registration Requirement Limiting Membership?; by Paul H. Robbins ..... May 34
Professional News ..... Feb 6
Why Engineer Registration; by Stephen Arthur Derry ..... Aug 26
Relation of Fundamental Research to Engineering, The; by Vannevar Bush ..... May 13

RESEARCH
Industrial Equipment Acquisition Research Center Planned; Prof. News ..... Aug 6
Puerto Rico's New Rum Plant ..... Sept 16
Relation of Fundamental Research to Engineering, The; by Vannevar Bush ..... May 13

Page

Special Report ..... May 17
Reservists Recall Would Affect One-Fourth of Nation's Chemical Engineers; Prof. News ..... July 6

ROBBINS, PAUL H.
Committee Function, The ..... Aug 28
Do We Have Enough Engineers?; ..... Nov. 34
Function of the Board, The ..... Sept 30
Is Our Registration Requirement Limiting Membership? ..... May 34
Our Public Relations Responsibilities ..... June 32
Professional Engineer in Industry, The; ..... Dec. 35
Professional Stature—Not Via Collective Bargaining ..... Oct 32
Unity for Professional Action ..... Apr 8
Why a Professional Society? ..... Mar 8
Robertson, Elgin ..... Oct 20
Rochester, N. Y., Engineering Manpower Survey ..... Feb 35
Role of the State University in Progress and Development, The; by Dr. Lewis Webster Jones ..... Jan 16
Romans Knew Their Roads, The ..... Mar 15

RUBENSTEIN, LOUIS J.
On Salary; Prof. Post. ..... May 32
Ryan, James J.: Inventor ..... Oct 26

RYAN, JOHN T., JR.
Safety Is Our Business ..... Nov 19

S

Safety Is Our Business; by John T. Ryan, Jr. ..... Nov 19

ST. LAWRENCE SEAWAY
From Washington; by Milton F. Lunch ..... June 16

SALARIES
Basic Results of NSPE Salary Survey Released ..... June 21
British Columbia Engineers Magazine editorial; Prof. Post. ..... Jan 24
Columbia Engineering Graduates' Salaries Reported; Prof. News ..... Aug 6
Crepea, William; Prof. Post. ..... Mar 27
NSPE to Conduct Income Survey ..... Mar 7
Professional News ..... Feb 6
Apr 6
Prof. Post. ..... May 32
Nov 29
Survey by NSPE ..... Nov 32

SANDERS, ARTHUR
Engineers Can Stop America's Greatest Waste ..... May 18

SARNOFF, BRIG. GEN. DAVID
Case for Technology, The ..... Oct 9

SCALES
Engineers Can Stop America's Greatest Waste; by Arthur Sanders ..... May 18

SEEGER, E. W.
Support of Engineering Education ..... May 27

SEWARD, P. A.
On Labor-Management; Prof. Post. ..... May 32
Sheridan, Arthur V., Tribute to, Past Pres., NSPE; by Dr. D. B. Steinman ..... Jan 25

SHOCH, CLARENCE T.
Design Factors in Engineering Unity ..... Sept 13

SHORTAGE, ENGINEER
BLS to Survey Future Demand for Chemical Engineers ..... June 25
Engineering Shortage in Atomic Energy Field; Prof. News ..... Sept 7
Manpower Council Makes Recommendations ..... June 27
Special Report ..... Nov 23

SLOANE, EDWARD J.
Army Acts on Engineer Utilization ..... Aug 19
Smithsonian Spotlights the Engineer, The ..... July 21

SOCIAL SECURITY
Do You Want Social Security Coverage? ..... Sept 22
From Washington; by Milton F. Lunch ..... Dec 25
Solar Energy Conference Planned; Prof. News ..... July 6
South Brings Its Building Codes Up to Date, The; by Soule' Butler ..... Mar 26

STANDARDIZATION
Arms Standardization Need Re-Emphasized ..... Jan 22
State Heads Discuss NSPE and Professional Problems ..... Apr 26

STEINMAN, DAVID B.
Poems ..... May 27
Feb 33
Dec. 34

Page

Professional News ..... Jan 8
Tribute to Arthur V. Sheridan, A ..... Jan 25
Steuber, William F., Jr.: Author ..... Oct 26
Support of Engineering Education; by E. W. Seeger ..... May 27

SURVEYS
Basic Results of NSPE Salary Survey Released ..... June 21
BLS To Survey Future Demand For Chemical Engineers ..... June 25
College Seniors' Employment Attitudes ..... Apr 27
Columbia Engineering Graduates' Salaries Reported; Prof. News ..... Aug 6
Employment; Prof. News ..... Dec 7
How to Improve the Utilization of Engineering Manpower ..... Feb 11
Income; Special Report ..... Apr 9
NSPE Readies Two Vital Reports for Publication ..... Oct 16
NSPE to Conduct Income Survey Among Members ..... Mar 7
P. E. Conference Board for Industry Reviews Questionnaires for Third Executive Survey ..... Aug 16
Reynolds, Conger, Community Relations Survey; Special Report ..... Dec 18
Salary ..... Sept 19
Nov 32

SWEIGERT, DR. R. L.
Graduate Education and the Profession ..... Apr 21

T

TAFT-HARTLEY ACT
Engineers Testify ..... May 30
From Washington; by Milton F. Lunch ..... Jan 5
Oct 21
Nov 13
Do You Know Your Federal Taxes? ..... Feb 36
Tax Cuts for Professional Education ..... Aug 8

TEAM RESEARCH
Special Report ..... Oct 8
Tennessee's Fonde Case Is Decided in Favor of Engineers' Position ..... Feb 5
There's Engineering in Exploration!; by Gilbert Grosvenor ..... Jan 11

TUCKER, MAYOR RAYMOND R.
Engineer in Public Life, The ..... Nov 9
Twentieth Century Magic ..... Aug 17
Twenty-Hour Work Week Seen Possible; Prof. News ..... June 6

U

UNIONS
Prof. Post. ..... May 31

UNITY
Design Factors in Engineering Unity; by Clarence T. Shoch ..... Sept 13
Professional Engineer, The—Ascending to New Heights or Leveling Off to Mediocrity; by W. R. Woolrich ..... Apr 24
Unity for Professional Action; by Paul H. Robbins ..... Apr 8
Unity in the Engineering Profession; by Sim C. Wright; Prof. Post. ..... Apr 30

UTILIZATION
Army Acts on Engineer Utilization; by Edward J. Sloane ..... Aug 19
From Washington; by Milton F. Lunch ..... June 15
How to Improve the Utilization of Engineering Manpower ..... Feb 11
Mar 19
Rochester, N. Y., Engineering Manpower Survey ..... Feb 35

W

We Cannot Survive with Labor-Management Strife; by Benjamin F. Fairless ..... Mar 11
We Must Keep Our Teachers; by Dr. Edwin S. Burdell ..... June 22
What Do We Really Mean by Education?; by Robert H. Nau ..... Sept 20
What Do We Want from our Monthly Magazine? ..... Feb 8
What Kind of an Executive Does an Engineer Make?; by Ernest E. Jenks ..... Oct 23
Why a Professional Society?; by Paul H. Robbins ..... Mar 8
Why Engineer Registration; by Stephen Arthur Derry ..... Aug 26
Why I Want to be a Professional Engineer; by B. C. Peralta ..... Aug 25

WOOLRICH, W. R.
Professional Engineer, The—Ascending to New Heights or Leveling Off to Mediocrity? ..... Apr 24

WRIGHT, SIM C.
Unity of the Engineering Profession; Prof. Post. ..... Apr 30

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The NSPE publications, as listed, are available upon order. Please use the form below, circling the numbers which correspond to the particular publications. Information on bulk orders of these items may be secured by writing to the Society. Remittance must accompany order.

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1. Canons of Ethics
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      Bernard Baruch
   d. An Engineer's Report on the Future—
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7. Canons of Ethics

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   Statement of policy by NSPE

9. Competitive Bidding for Professional Services
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13. Every Man A Debtor
    Informational pamphlet on NSPE policies and programs suitable for membership promotion, 16 p.

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    Reprint from ECPD Annual Report

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    Policy statement by NSPE

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•

PLEASE PRINT ALL INFORMATION

Strictly Business

New Firms and Offices . . . The New York office of BURNS AND ROE, INC., engineers and constructors, has announced the formation of BURNS AND ROE OF MICHIGAN, INC., with offices in the Book Building in Detroit. Simultaneously, CHARLES S. LUMLEY has been appointed vice president and general manager of BURNS AND ROE OF MICHIGAN, INC. The new firm will provide a complete architectural and engineering service for clients in the Great Lakes region. . . . The Houston, Texas, firm of HOWARD & JOHNSON has recently been dissolved and two new consulting engineering firms have been established by the former partners. JAMES H. HOWARD has announced the formation of JAMES H. HOWARD & ASSOCIATES, a consulting organization which will specialize in mechanical and electrical engineering for construction projects, providing the service for architects as well as commercial and industrial firms; while BERNARD G. JOHNSON has announced the establishment of BERNARD JOHNSON & ASSOCIATES, consulting engineers, in conjunction with WELDON W. HENDERSON, RALPH J. SPEICH, CURTIS H. JOCHEN, and ARTHUR M. RICE.

Mr. Lumley

HUGH F. FENLON, consulting engineer on structural designs and services, has opened an office in the Mortgage-Guarantee Building in Atlanta, Georgia. Mr. Fenlon was formerly with J. J. CHASE & ASSOCIATES, architects and engineers. . . . The AMERICAN RESEARCH AND DEVELOPMENT CORPORATION of Boston, Mass., has announced the formation of the PRODUCT DEVELOPMENT CORPORATION, a firm which will offer a product consulting service to clients in various industries. MERRILL GRISWOLD has been elected chairman of the board of the new company, and JOHN F. ROCKETT, JR., is the firm's president. . . . HERBERT D. MENDENHALL has announced the opening of an office for the practice of architecture and structural engineering at 718 West Pensacola Street, Tallahassee, Florida.

►

Operational Expansion . . . The CAROLINA SOLITE CORPORATION's new million dollar plant in Aquadale, N. C., has just gone on a full seven days a week operation schedule, according to an announcement by JOHN W. ROBERTS, president. . . . Completion of a new 18,000 square foot, one story branch office and factory in Cleveland, O., has been announced by the WACO MANUFACTURING COMPANY, manufacturers of steel scaffolding and shoring equipment, with headquarters in Minneapolis, Minn. . . . FOSTER WHEELER CORPORATION, manufacturers of heavy equipment for steam power plants, oil refineries, and process industries, has begun limited operations at a new plant in Mountaintop, Pa. KENNETH L. WALKER has been appointed superintendent of the new facility. . . . The MARLO COIL CO. of St. Louis has started construction on a new plant which will total 260,000 square feet when completed, four times the company's present plant size. BRUSSEL AND VITERBO of St. Louis are consulting engineers for the project. . . . An open house for business guests, employees, and friends marked the recent opening of the expanded main plant of TEXAS INSTRUMENTS, INC., of Dallas. The corporation has also recently merged with INTERCONTINENTAL RUBBER CO.

Mr. Walker

►

Personalities . . . Appointment of CHARLES W. PUNTON as director of engineering for the MINE SAFETY APPLIANCES COMPANY, Pittsburgh, Pa., has been announced by GEORGE H. DEIKE, JR., vice president. . . . EDMUND L. RYDER has been named assistant manager of AIRESEARCH AVIATION SERVICE COMPANY, Los Angeles, according to J. J. O'BRIEN, company manager; and FRANK R. BERRY, JR., has been promoted from project engineer to chief engineer with the same firm. . . . H. H. LEVONIAN has been appointed vice president in charge of construction for THE KULJIAN CORPORATION, Philadelphia engineers and constructors. . . . MAURICE NICHOLLS has assumed the duties of manager of the New York office of KAISER ENGINEERS. . . . The COMBUSTION CONTROL CORPORATION of Boston, Mass., has announced the appointment of ARNE LOVENDAHL as manager of its Philadelphia office. . . . New staff members of the MIDWEST RESEARCH INSTITUTE, Kansas City, Mo., are: RAYMOND L. OPPER, an electrical engineer, and DAVID H. HUGHES, associate physicist.

FITCH B. JEFFERIES, president of the ENGINEERING CORPORATION OF AMERICA, Westfield, N. J., has announced the appointment of C. H. NICHOLS as head of the Chemical Engineering Process Design Division. . . . R. A. HUMMEL, chairman of the LONE STAR CEMENT CORPORATION, New York, has been re-elected chairman of the board of directors of the PORTLAND CEMENT ASSOCIATION. Five new directors also elected by the Association include: CHARLES HORNER, president and general manager, KOSMOS PORTLAND CEMENT CO., Louisville, Ky.; MAX E. GRUNEWALD, president, COPLAY CEMENT MFG. CO., Coplay, Pa.; DWIGHT A. SYMMES, president, GLENS FALLS PORTLAND CEMENT CO., Glens Falls, N. Y.; WALDO E. TYLER, president, DEWEY PORTLAND CEMENT CO., Kansas City, Mo.; and FRANK B. WARREN, president, BESSEMER LIMESTONE AND CEMENT CO., Youngstown, O. . . . DR. RAYMOND M. FUOSS has joined the staff of the UNITED STATES TESTING COMPANY, INC., Hoboken, N. J., as a consultant and will be responsible for research activities in the company's Boston laboratories. . . . The board of directors of the HINCHMAN CORPORATION, Detroit engineers, recently appointed L. P. SCHAEFER, head of the Engineering Department, to the post of secretary of the corporation.

►

Reorganization and Changes . . . The firm of BERETTA, GREENSLADE, CLARK & COLLINS, INC., San Antonio, Tex., has succeeded to all the engineering business of J. W. BERETTA ENGINEERS, INC. Associates in the reorganized enterprise include: J. W. BERETTA, WILLIAM F. GREENSLADE, JR., ODIS H. CLARK, JR., and MALCOLM A. COLLINS. . . . Negotiations have recently been concluded whereby the TURNER CONSTRUCTION COMPANY of New York will acquire an important financial interest in THE FERRO CONCRETE CONSTRUCTION CO. of Cincinnati, O., according to an announcement from H. D. LORING, president of the Cincinnati firm.

What's New

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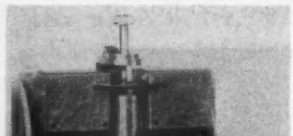
TESTER FOR BALL BEARINGS — *Item 1*



Baker-United Air Lines Ball Bearing Torque Tester designed to fill the need for a rapid responding tester comparing breakaway, starting and running torque; evaluating race roughness and dirt in precision ball bearings, values essential in the selection of quality ball bearings for either development work or fast moving production. Gives a comparative measure of starting torque and race roughness.

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PREVENTS CESSPOOL CLOGGING — *Item 2*

A new bacteria discovery, specifically designed to prevent cesspool clogging all year around in a single application, is announced by The Fermex Company.

The new product, which is being marketed under the trade name of Formula FX-7, is the result of carefully selecting, adapting, and culturing several bacteria strains that continuously produce proteolytic enzymes by feeding on the organic matter within the cesspool.

Because of its active nature, the bacteria culture reproduces itself, thus assuring all year 'round prevention of cesspool clogging.

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SUBMINIATURE CATHODE FOLLOWER — *Item 3*

The new Subminiature Cathode Follower of Endevco Corporation for impedance transformation now permits vibration and shock area location of electronic equipment associated with high impedance instruments. Cathode Follower satisfies the needs of piezo-electric Accelerometers, Force Gages and Pressure Pickups. Endevco Model 2608 Cathode Follower is internally shock-mounted, has etched wiring, subminiature shock resistant tubes and Tantalytic Capacitors.

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NEW TYPE REVERSIBLE RIPPER — *Item 4*

The Kritzer Reversible Ripper (Patent Applied For) offers operators a real money saving opportunity in addition to doing an outstanding job of ripping in most type formations including sand stone, decomposed granite, and hard pan. The Kritzer Ripper mounts directly on the tractor and is adjustable for digging depth between 8" and 16". It is set to operate automatically while the tractor is either in forward or reverse motion. A standard ripper tooth is used and may be installed for either side or draw bar mounting. It rips straight, being guided by the course of the tractor itself.

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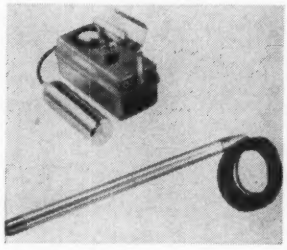
COUPLING FOR GROOVED PIPE — *Item 5*

The "Gruvajoint" is a new lightweight coupling for grooved pipe systems designed and produced by Gustin-Bacon Manufacturing Co.

Gruvajoints are specifically designed to save time, weight, freight and space in coupling grooved pipe systems where pressures do not exceed 500 pounds per square inch. The original cost is approximately 15% less than conventional grooved pipe couplings; weight, about 40% less. Light and compact, they are easy to handle and store, can be quickly installed in close working areas.

This column describes new products of general interest to professional engineers. For further information, fill in the coupon provided and mail to the AMERICAN ENGINEER.

SCINTILLATION COUNTERS — *Item 6*



The Radiac Company, Inc. presents two new scintillation counters for uranium and oil prospecting surveys. The "Fission Finder" Scintillation Survey Meter and the "Fission Tackle" Scintillation Drill Hole Probe-type Radio-activity Detector are self-contained battery operated scintillation counters for detecting and measuring radio-activity. These instruments are gamma sensitive, and are approximately 100 times more sensitive than the average Geiger counter. The "Fission Finder" Survey Meter can detect alpha and beta activity.

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STEEL-REINFORCED FLOORING UNIT — *Item 7*

A completely new "packaged unit" heavy duty flooring is announced by United Laboratories, Inc. Called "Steel-Rock," this new flooring combines for the first time a heavy steel mesh and special filler as a complete unit for surfacing floors subjected to extra-tough abuse. Claimed to out-live the building itself, this amazingly tough flooring meets the rugged requirements of modern industrial production and materials handling problems. "Steel-Rock" is purposely engineered to combat floor destruction caused by tons of heavy rolling traffic.

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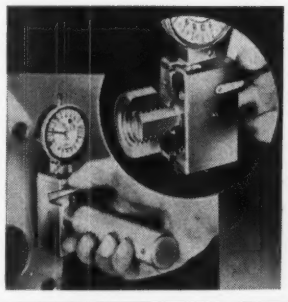
INDICATING THREAD GAGES — *Item 8*



The George Scherr Company announces a new line of Indicating Thread Gages. One is a Roller Thread Pitch Diameter Comparator Gage and the other a Dial Thread Plug Gage for checking internal threads. Both instruments are designed for quick inspection by unskilled operators. A greal deal of time and labor is saved by using these gages as compared with conventional methods of gaging threads, especially the screwing in and out of thread plug gages. All errors due to unequal pressure and "feel" are said to be elminated.

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ULTRA-THIN BRONZE — *Item 9*

Phosphor bronze strip, precision-rolled to very close tolerances and to thin gauges and foils, for use throughout industry, is now readily available from the Industrial Division, American Silver Company, Inc.

The metal possesses high tensile and yield strength, good ductility, resiliency, high fatigue strength, wear resistance and good bearing qualities. The phosphor bronze strip is custom rolled by this company in strip up to 6″ wide and down to .0005″, to tolerances as close as plus or minus .0001″. The strip is available in any quantity from 1 lb. to thousands of pounds.

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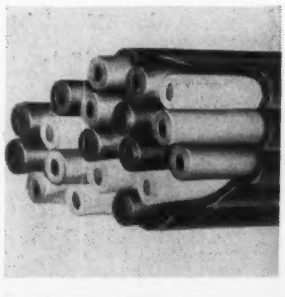
TUBING HARNESS — *Item 10*



Dekoron Impervapak Poly-Cor, a patented instrument tubing harness, is now available with color-coded lines, according to a recent announcement by Samuel Moore & Company. Color coding simplifies installation of instrument lines because the coding is as easy to follow as that used on electric wiring. Available with 4, 7, 10, 14, or 19 tubes, has individual lines coded in black, red, blue, or green. Other colors supplied on special order.

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But why MEN over 45?

Our doctors still don't know *why*, but if you are a man over 45 you are six times as likely to develop lung cancer as a man of your age twenty years ago. They *do* know, however, that their chances of saving your life could be about *ten times* greater if they could only detect cancer long before you notice any symptom in yourself. (Only 1 in every 20 lung cancers is being cured today, largely because most cases progress too far before detected.) That's why we urge that you make a habit of having your chest X-rayed every six months, no matter how well you may *feel*. The alarming increase of lung cancer in men over 45 more than justifies such precautions. Far too many men die needlessly.

Our new film "The Warning Shadow" will tell you what every man should know about lung cancer. To see this film and to get life-saving facts about other forms of cancer, phone the American Cancer Society office nearest you or simply write to "Cancer"—in care of your local Post Office.

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